Color Television

Chassis

Q552.2L

LA

Service
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Service

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Service Manual

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Published by ER/TY 1164 BU TV Consumer Care, the Netherlands Subject to modification EN 3122 785 19110
2011-Apr-22

PHILIPS

1. Revision List

Manual xxxx xxx xxxx.0

- First release.

2. Technical Specifications, Diversity, and Connections

Index of this chapter:

2.1 Technical Specifications
2.2 Directions for Use
2.3 Connections
2.4 Chassis Overview

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

2.1 Technical Specifications

For on-line product support please use the CTN links in Table 2-1. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

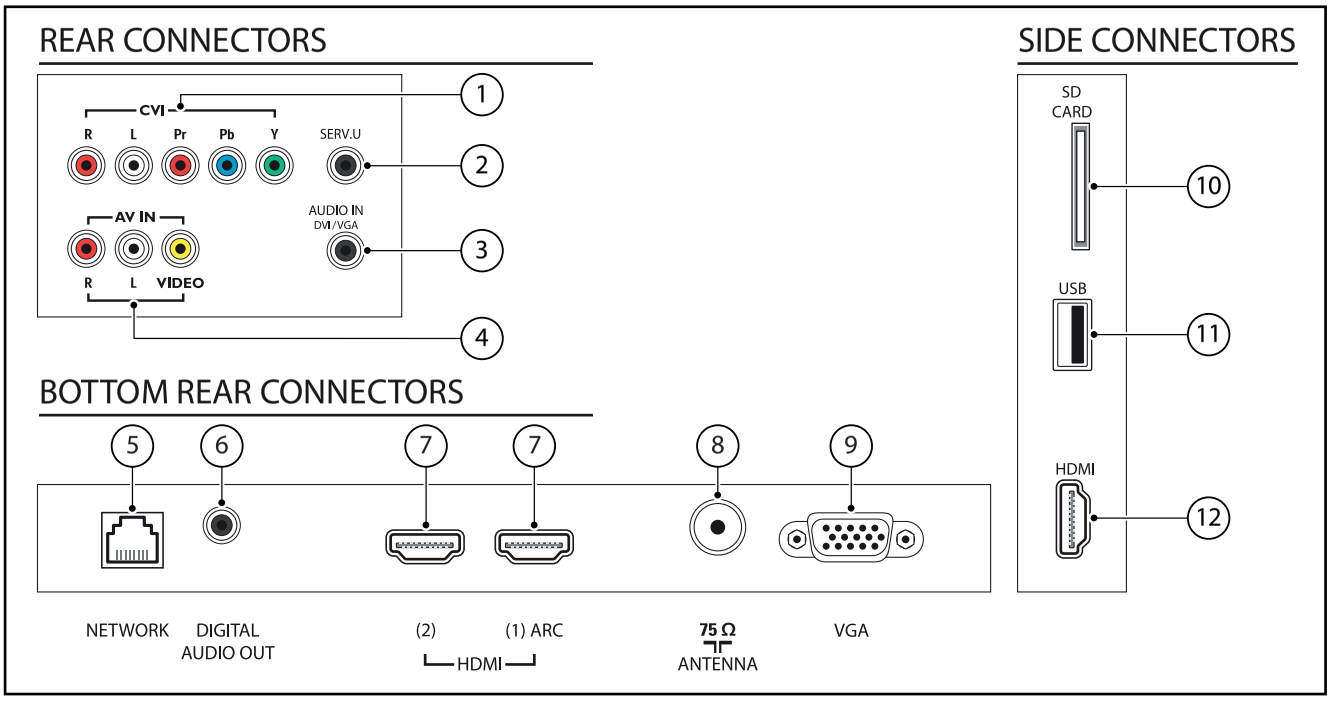
Table 2-1 Described Model Numbers and Diversity

CTN	Styling	SSB	2	4			7		9	10									
				Mechanics			Descriptions			Schematics									
		3139 123 xxxxx	Connection Overview	Wire Dressing Dressing	Assembly Removal	LCD Removal	PSU	Tuner	Wiring Diagram	B01 (Tuner)	B02 (PNX85500)	B03 (DC/DC / Class D)	B04 (I/O)	B05 (DDR)	B06 (non-DVBS-LVDS)	B07 (DVBS-FE)	B08 (DVBS-Supp.)	B09 (non-DVBS-conn.)
40PFL6606D/78	Blockbuster 11-2	65213	2.3	4-1	4.3	4.3.7	7.2	7.4.1	9-2	10-1	10-2	10-3	10-4	10-5	10-6	-	-	10-7

2.2 Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

2.3 Connections



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110421

Figure 2-1 Connection overview

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

2.3.1 Rear Connections

1 - CVI: Cinch: Video YPbPr - In, Audio - In

Gn	- Video Y	1 V_{PP} / 75 ohm
Bu	- Video Pb	0.7 V_{PP} / 75 ohm
Rd	- Video Pr	0.7 V_{PP} / 75 ohm
Rd	- Audio - R	0.5 V_{RMS} / 10 kohm
Wh	- Audio - L	0.5 V_{RMS} / 10 kohm

2 - Service Connector (UART)

1	- Ground	Gnd
2	- UART_TX	Transmit
3	- UART_RX	Receive

3 - Cinch: Audio - In (VGA/DVI)

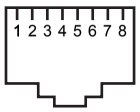
Rd	- Audio R	0.5 V_{RMS} / 10 kohm
Wh	- Audio L	0.5 V_{RMS} / 10 kohm

4 - AV IN: Cinch: Video CVBS - In, Audio - In

Rd	- Audio R	0.5 V_{RMS} / 10 kohm
Wh	- Audio L	0.5 V_{RMS} / 10 kohm
Ye	- Video CVBS	1 V_{PP} / 75 ohm

2.3.2 Rear Connections - Bottom

5 - RJ45: Ethernet



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090121

Figure 2-2 Ethernet connector

1	- TD+	Transmit signal	
2	- TD-	Transmit signal	
3	- RD+	Receive signal	
4	- CT	Centre Tap: DC level fixation	
5	- CT	Centre Tap: DC level fixation	
6	- RD-	Receive signal	
7	- GND	Gnd	
8	- GND	Gnd	

6 - Cinch: S/PDIF - Out

Bk	- Coaxial	0.4 - 0.6V_{PP} / 75 ohm

7 - HDMI 2: Digital Video, Digital Audio - In

10000_017_090121.eps
090428

Figure 2-3 HDMI (type A) connector

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- Easylink/CEC	Control channel	
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

back to div. table

7 - HDMI 1: Digital Video - In, Digital Audio with ARC - In/ Out

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090428

Figure 2-4 HDMI (type A) connector

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- Easylink/CEC	Control channel	
14	- ARC	Audio Return Channel	
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

8 - Aerial - In

-	- F-type	Coax, 75 ohm	

9 - VGA: Video RGB - In

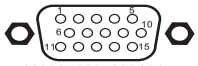

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Figure 2-5 VGA Connector

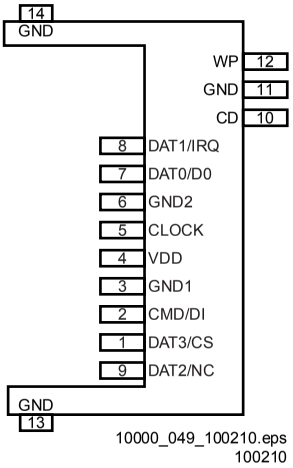
1	- Video Red	0.7 V_{PP} / 75 ohm	
2	- Video Green	0.7 V_{PP} / 75 ohm	
3	- Video Blue	0.7 V_{PP} / 75 ohm	
4	- n.c.		
5	- Ground	Gnd	
6	- Ground Red	Gnd	
7	- Ground Green	Gnd	
8	- Ground Blue	Gnd	
9	- $+5V_{DC}$	+5 V	
10	- Ground Sync	Gnd	
11	- n.c.		
12	- DDC_SDA	DDC data	
13	- H-sync	0 - 5 V	
14	- V-sync	0 - 5 V	
15	- DDC_SCL	DDC clock	

2.4 Chassis Overview

Refer to chapter Block Diagrams for PWB/CBA locations.

2.3.3 Side Connections

10 - SD-Card: Secure Digital Card - In/Out (optional)



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100210

Figure 2-6 SD-Card connector

1	- DAT3/CS	Signal	
2	- CMD/DI	Signal	
3	- GND1	Gnd	
4	- Vdd	Supply	
5	- CLOCK	Signal	
6	- GND2	Gnd	
7	- DAT0/D0	Signal	
8	- DAT1/IRQ	Signal	
9	- DAT2/NC	Signal	
10	- CD	Signal	
11	- GND	Gnd	
12	- WP	Signal	
13	- GND	Gnd	
14	- GND	Gnd	

11 - USB2.0

10000_022_090121.eps
090121

Figure 2-7 USB (type A)

1	- +5V		
2	- Data (-)		
3	- Data (+)		
4	- Ground	Gnd	

12- HDMI : Digital Video, Digital Audio - In

See 7 - HDMI 2: Digital Video, Digital Audio - In

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

3.1 Safety Instructions
3.2 Warnings
3.3 Notes
3.4 Abbreviation List

3.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the “on” position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch “off” the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

3.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched “on”.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

3.3 Notes

3.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.

3.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an “E” or an “R” (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An “asterisk” (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

For the latest spare part overview, consult your Philips Spare Part web portal.

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: http://www.atyourservice-magazine.com. Select “Magazine”, then go to “Repair downloads”. Here you will find Information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilize the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

3.3.6 Alternative BOM identification

It should be noted that on the European Service website, “Alternative BOM” is referred to as “Design variant”.

The **third digit** in the serial number (example: AG**2**B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.
By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number "1" (example: AG**1**B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG**2**B0335000001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!
For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. SN is Lysomice, RJ is Kobierzyce), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.

PHILIPS
ASSEMBLED IN POLAND
S Q552.1E LA
Model No.: 40PFL5605H/12
Serial No.: SN 1A1010 007995
PHILIPS
MODEL NO.: 32PFL3605H/12
WARNING
ALWAYS remove mains plug from wall socket before any Service operation.
NEVER remove covers unless qualified to do so. This unit contains dangerous voltages.
ATTENZIONE: PERICOLO DI ALTA TENSIONE. NON APRIRE LO SCHIENALE.
POZOR! V přístroji je vysoké napětíe.
Před otevřením krytu je potřebné vybrat vidlicu elektrického přívodu ze zásuvky.
S TPMS.1E LA
Vigyázat, nagyfeszültség!
A készülék burkolatának eltávolítása életveszélyes!
Manufactured under license from Dolby Laboratories.
Dolby and the double-D symbol are trademarks of Dolby Laboratories.
MODEL NO 32PFL3605H/12
SERIAL NO: RJ1A1017001790
10000_053_110228.eps
110228

Figure 3-1 Serial number (example)

3.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.
If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3.4 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16 : 9 format, 12 = play 4 : 3 format
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See "E-DDC"
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion

DFU	Directions For Use: owner's manual
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion
DNR	Digital Noise Reduction: noise reduction feature of the set
DRAM	Dynamic RAM
DRM	Digital Rights Management
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for service technicians
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394
DVB-C	Digital Video Broadcast - Cable
DVB-T	Digital Video Broadcast - Terrestrial
DVD	Digital Versatile Disc
DVI(-d)	Digital Visual Interface (d= digital only)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EMI	Electro Magnetic Interference
EPG	Electronic Program Guide
EPLD	Erasable Programmable Logic Device
EU	Europe
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FDS	Full Dual Screen (same as FDW)
FDW	Full Dual Window (same as FDS)
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FPGA	Field-Programmable Gate Array
FTV	Flat TeleVision
Gb/s	Giga bits per second
G-TXT	Green TeleteXT
H	H_sync to the module
HD	High Definition
HDD	Hard Disk Drive
HDCP	High-bandwidth Digital Content Protection: A “key” encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a “snow vision” mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP “software key” decoding.
HDMI	High Definition Multimedia Interface
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I^2C	Inter IC bus
I^2D	Inter IC Data bus
I^2S	Inter IC Sound bus
IF	Intermediate Frequency
IR	Infra Red
IRQ	Interrupt Request
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
LS	Last Status; The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
LATAM	Latin America
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LPL	LG.Philips LCD (supplier)
LS	Loudspeaker
LVDS	Low Voltage Differential Signalling
Mbps	Mega bits per second
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
MOP	Matrix Output Processor
MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
MPEG	Motion Pictures Experts Group
MPIF	Multi Platform InterFace
MUTE	MUTE Line
MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTC	Negative Temperature Coefficient, non-linear resistor
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non-Volatile Memory: IC containing TV related data such as alignments
O/C	Open Circuit
OSD	On Screen Display
OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
P50	Project 50: communication protocol between TV and peripherals
PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier

	PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit Board (same as “PWB”)
PCM	Pulse Code Modulation
PDP	Plasma Display Panel
PFC	Power Factor Corrector (or Pre-conditioner)
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)
POR	Power On Reset, signal to reset the uP
PSDL	Power Supply for Direct view LED backlight with 2D-dimming
PSL	Power Supply with integrated LED drivers
PSLS	Power Supply with integrated LED drivers with added Scanning functionality
PTC	Positive Temperature Coefficient, non-linear resistor
PWB	Printed Wiring Board (same as “PCB”)
PWM	Pulse Width Modulation
QRC	Quasi Resonant Converter
QTNR	Quality Temporal Noise Reduction
QVCP	Quality Video Composition Processor
RAM	Random Access Memory
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.
RC	Remote Control
RC5 / RC6	Signal protocol from the remote control receiver
RESET	RESET signal
ROM	Read Only Memory
RSDS	Reduced Swing Differential Signalling data interface
R-TXT	Red TeleteXT
SAM	Service Alignment Mode
S/C	Short Circuit
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs
SCL	Serial Clock I^2C
SCL-F	CLock Signal on Fast I^2C bus
SD	Standard Definition
SDA	Serial Data I^2C
SDA-F	DAta Signal on Fast I^2C bus
SDI	Serial Digital Interface, see “ITU-656”
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Mémoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switched Mode Power Supply
SoC	System on Chip
SOG	Sync On Green
SOPS	Self Oscillating Power Supply
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SRP	Service Reference Protocol
SSB	Small Signal Board
SSC	Spread Spectrum Clocking, used to reduce the effects of EMI
STB	Set Top Box
STBY	STand-BY
SVGA	800 × 600 (4:3)
SVHS	Super Video Home System
SW	Software
SWAN	Spatial temporal Weighted Averaging Noise reduction
SXGA	1280 × 1024
TFT	Thin Film Transistor
THD	Total Harmonic Distortion
TMDS	Transmission Minimized Differential Signalling
TS	Transport Stream
TXT	TeleteXT
TXT-DW	Dual Window with TeleteXT
UI	User Interface
uP	Microprocessor
UXGA	1600 × 1200 (4:3)
V	V-sync to the module
VESA	Video Electronics Standards Association
VGA	640 × 480 (4:3)
VL	Variable Level out: processed audio output toward external amplifier
VSB	Vestigial Side Band; modulation method
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
WXGA	1280 × 768 (15:9)
XTAL	Quartz crystal
XGA	1024 × 768 (4:3)
Y	Luminance signal
Y/C	Luminance (Y) and Chrominance (C) signal
YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
YUV	Component video

4. Mechanical Instructions

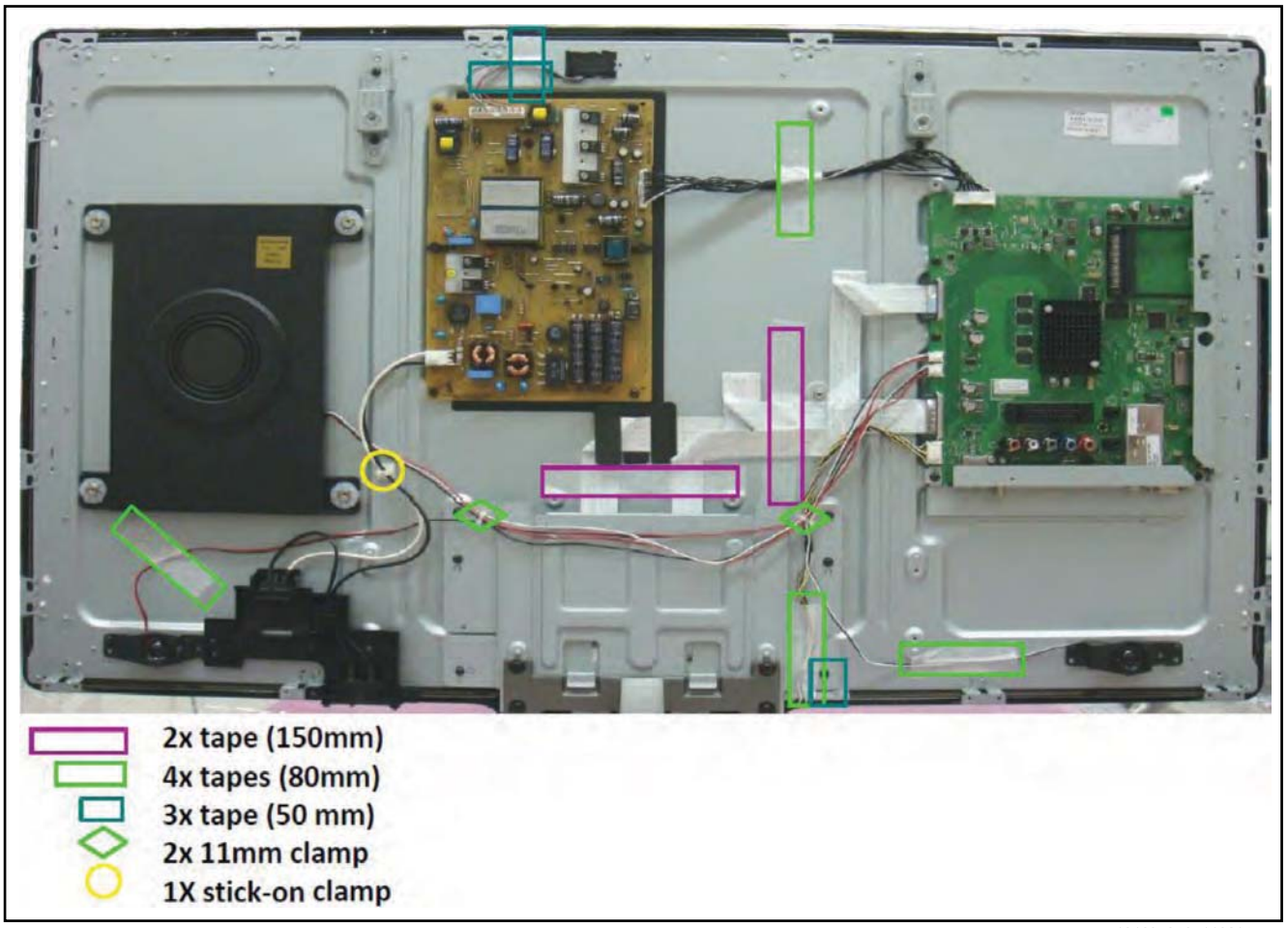
Index of this chapter:

4.1 Cable Dressing Blockbuster Styling (xxPFL66xx/xx series)
4.2 Service Positions
4.3 Assy/Panel Removal Blockbuster Styling (xxPFL66xx/xx series)
4.4 Set Re-assembly

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing Blockbuster Styling (xxPFL66xx/xx series)



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110214

Figure 4-1 Cable dressing 40PFL6606x/xx (Blockbuster) - picture taken from an European set

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display!
Ensure that ESD safe measures are taken.

4.3 Assy/Panel Removal Blockbuster Styling (xxPFL66xx/xx series)

For the 40" and 46" Blockbuster sets, additional instructions (rear cover removal) apply. Refer to subsection Additional instructions for Blockbuster 40-/46PFL6606x/xx.

The instructions apply to the 37PFL6606H/12 (European model).

4.3.1 Rear Cover

Warning: Disconnect the mains power cord before you remove the rear cover.
Note: it is **not** necessary to remove the stand while removing the rear cover.

1. Remove all screws of the rear cover.
2. Lift the rear cover from the TV. Make sure that wires and flat coils are not damaged while lifting the rear cover from the set.

Additional instructions for Blockbuster 40-/46PFL6606x/xx
40"and 46"Blockbuster (40-/46PFL6606x/xx) sets have a dedicated method to open the bottom catches when removing the rear cover.
Refer to Figure 4-2 and Figure 4-3 for details.

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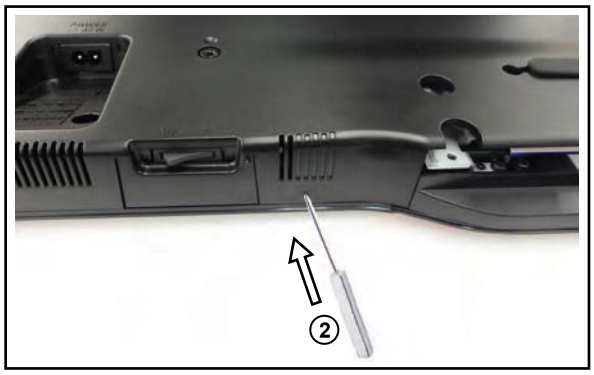
110216

Figure 4-2 Bottom catches 40" and 46" Blockbuster sets -1-



19100_049_110216.eps
110216

Figure 4-3 Bottom catches 40" and 46" Blockbuster sets -2-

It is advised to lay the set with front facing down before executing this operation.
1. Remove all screws from the rear cover.
2. Use a round rod (diameter 2 mm) and insert it in one of the holes [1].
3. Push the catch located inside the rear cover away by inserting the rod [2] through the hole and lifting the rear cover at the same time.
4. Repeat the same procedure on the other hole.

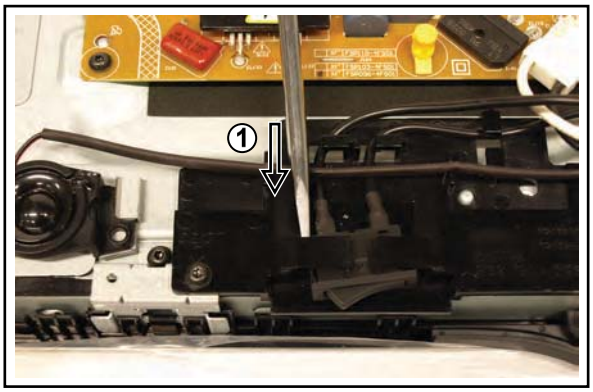
4.3.2 Speakers

Tweeters
Each tweeter unit is mounted with two screws.
When defective, replace the whole unit.

Subwoofer
The central subwoofer is located in the centre of the set and is secured by two bosses.
When defective, replace the whole unit.

4.3.3 Mains Switch

Refer to Figure 4-4 for details.



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110216

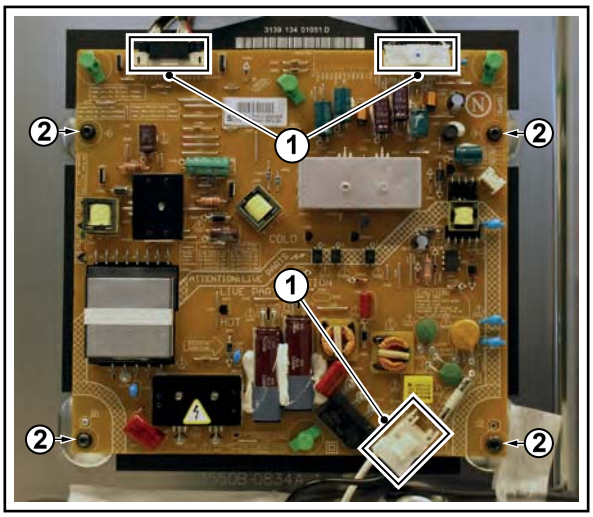
Figure 4-4 Mains switch

The mains switch is mounted on a plastic subframe and can be removed without removing the subframe.
1. Use a screwdriver and push the switch out of its casing [1].
2. Unplug the connectors.

When defective, replace the whole unit.

4.3.4 Main Power Supply

Refer to Figure 4-5 for details.



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110407

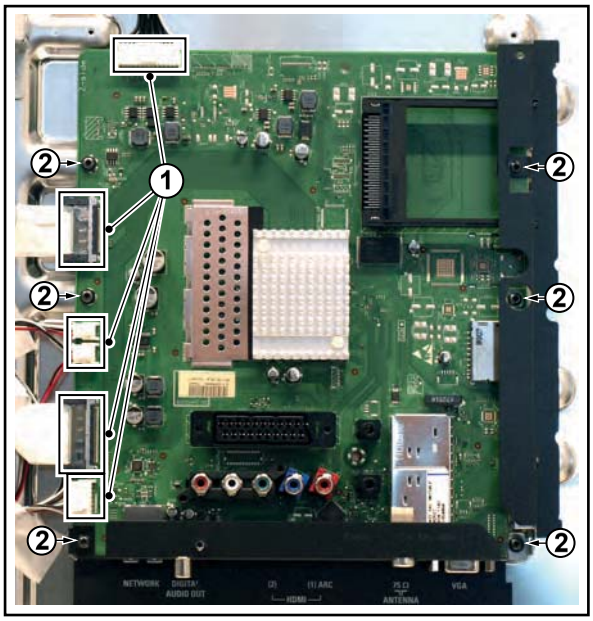
Figure 4-5 Main Power Supply

1. Unplug all connectors [1].
2. Remove the fixation screws [2].
3. Take the board out.

When defective, replace the whole unit.

4.3.5 Small Signal Board (SSB)

Refer to Figure 4-6 for details.



19101_007_110407.eps
110407

Figure 4-6 SSB

1. Unplug all connectors [1].
2. Remove the fixation screws [2].
3. Take the board out.

When remounting, ensure that the side shielding is positioned correctly.

4.3.6 Keyboard Control, IR & LED Board

Refer to Figure 4-7 and Figure 4-8 for details.

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Figure 4-7 Keyboard control, IR & LED board [1/2]

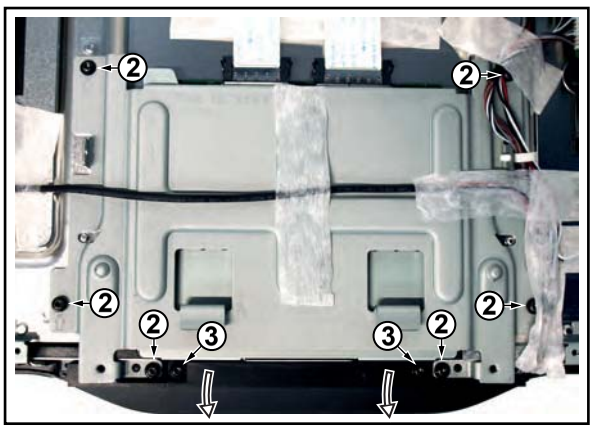

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Figure 4-8 Keyboard control, IR & LED board [2/2]

1. Remove the stand [1].
2. Remove the stand subframe [2].
3. Remove the screws [3], unplug the connector and take the board out.

When defective, replace the whole unit.

4.3.7 LCD Panel

Refer to Figure 4-9 to Figure 4-11 for details.

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the tweeters with their subframes and subwoofer as described earlier.
4. Remove the stand and -subframe as described earlier.
5. Remove the cables [1].
6. Remove the mains switch subframe [2].
7. Remove the keyboard control-, and IR & LED board as described earlier.
8. Remove all remaining cables and subframes.
9. Use a screwdriver to release the catches [3] that secure the panel.
10. Use a screwdriver to release the catches and remove the sidewings [4] that secure the panel.
11. Take the panel out.

Remove the clamps from the panel before sending the panel in for Service.

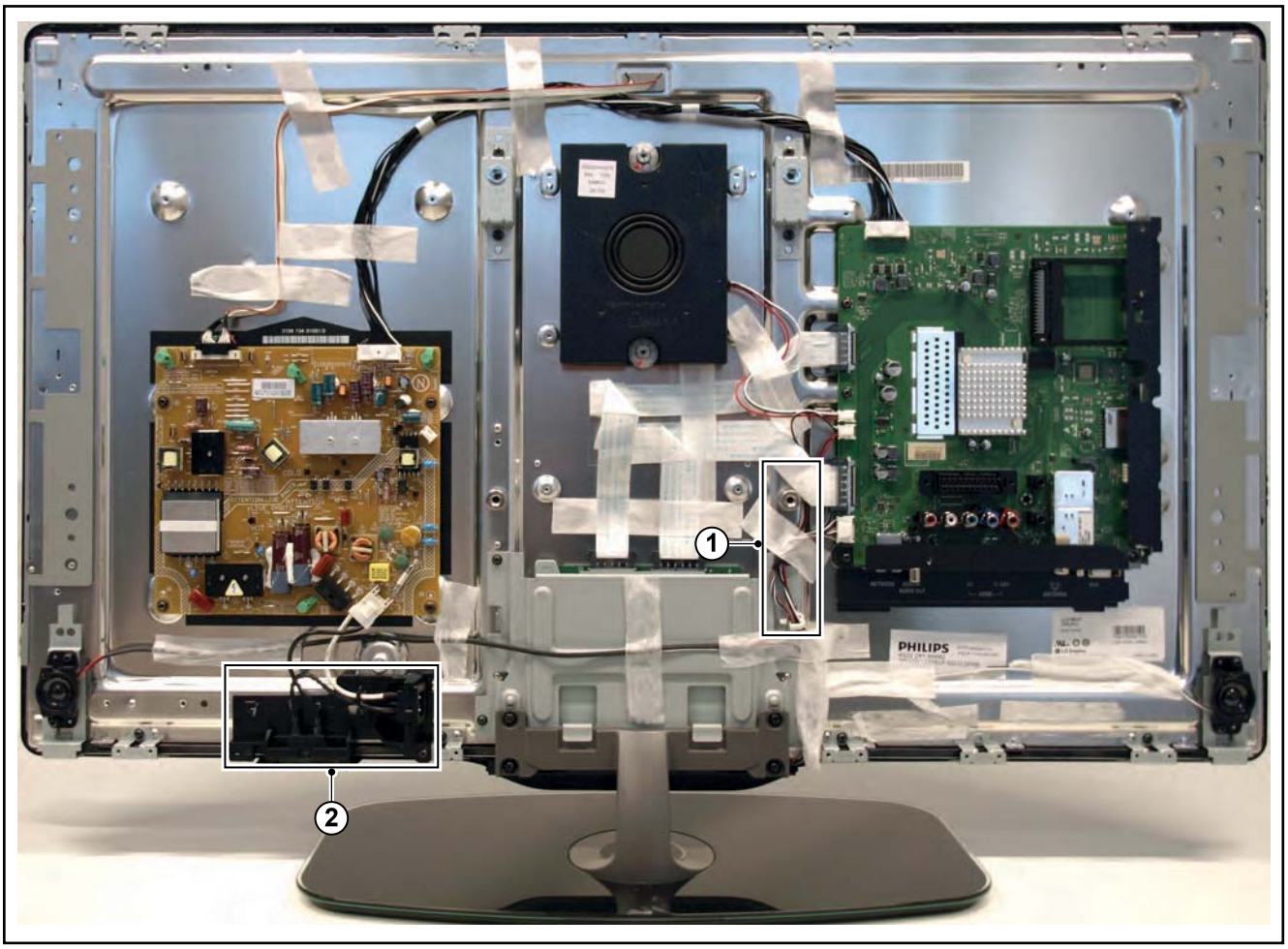

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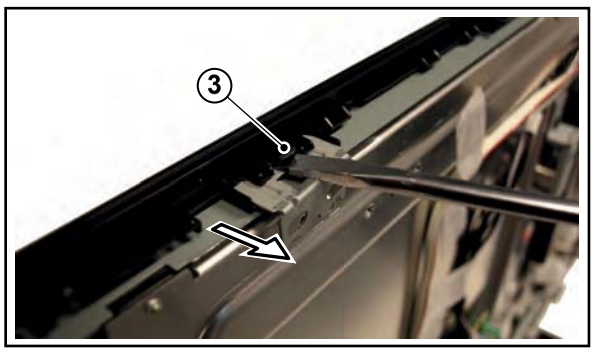
Figure 4-9 LCD panel [1/3]



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110407

Figure 4-10 LCD panel [2/3]

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110407

Figure 4-11 LCD panel [3/3]

4.4 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position.
- Pay special attention not to damage the EMC foams in the set. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points
5.2 Service Modes
5.3 Stepwise Start-up
5.4 Service Tools
5.5 Error Codes
5.6 The Blinking LED Procedure
5.7 Protections
5.8 Fault Finding and Repair Tips
5.9 Software Upgrading

5.1 Test Points

As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. However, several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:
- Service Default Mode.
- Video: Color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default mode (SDM) and Service Alignment Mode (SAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the call centre and the customer.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version read-out for all chassis. (see also section "5.4.1 ComPair").

Note: For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old "MENU" button is now called "HOME" (or is indicated by a "house" icon).

5.2.1 Service Default Mode (SDM)

Purpose
- To create a pre-defined setting, to get the same measurement results as given in this manual.
- To override SW protections detected by stand-by processor and make the TV start up to the step just before protection (a sort of automatic stepwise start-up). See section "5.3 Stepwise Start-up".
- To start the blinking LED procedure where only LAYER 2 errors are displayed. (see also section "5.5 Error Codes").

Specifications

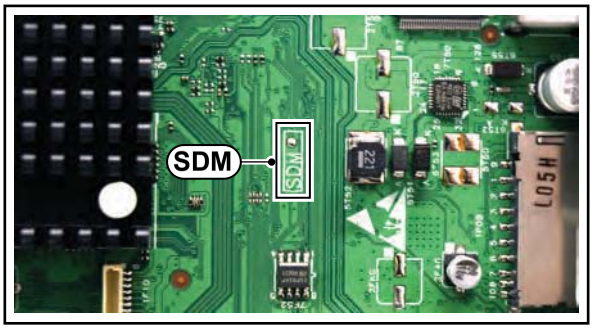
Table 5-1 SDM default settings

Region	Freq. (MHz)	Default system
Europe, AP(PAL/Multi)	475.25	PAL B/G
Europe, AP DVB-T	546.00 PID Video: 0B 06 PID PCR: 0B 06 PID Audio: 0B 07	DVB-T

- All picture settings at 50% (brightness, color, contrast).
- Sound volume at 25%.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer.
  - Child/parental lock.
  - Picture mute (blue mute or black mute).
  - Automatic volume levelling (AVL).
  - Skip/blank of non-favorite pre-sets.

How to Activate SDM

For this chassis there are two kinds of SDM: an **analogue SDM** and a **digital SDM**. Tuning will happen according Table 5-1.
- **Analogue SDM**: use the standard RC-transmitter and key in the code "062596", directly followed by the "MENU" (or "HOME") button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or "HOME") button again.
  Analogue SDM can also be activated by grounding for a moment the solder path on the SSB, with the indication "SDM" (see Service mode pad).
- **Digital SDM**: use the standard RC-transmitter and key in the code "062593", directly followed by the "MENU" (or "HOME") button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or "HOME") button again.



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110217

Figure 5-1 Service mode pad

After activating this mode, "SDM" will appear in the upper right corner of the screen (when a picture is available).

How to Navigate

When the "MENU" (or "HOME") button is pressed on the RC transmitter, the TV set will toggle between the SDM and the normal user menu.

How to Exit SDM

Use one of the following methods:
- Switch the set to STAND-BY via the RC-transmitter.
- Via a standard customer RC-transmitter: key in "00"-sequence.

5.2.2 Service Alignment Mode (SAM)

Purpose
- To perform (software) alignments.
- To change option settings.
- To easily identify the used software version.
- To view operation hours.
- To display (or clear) the error code buffer.

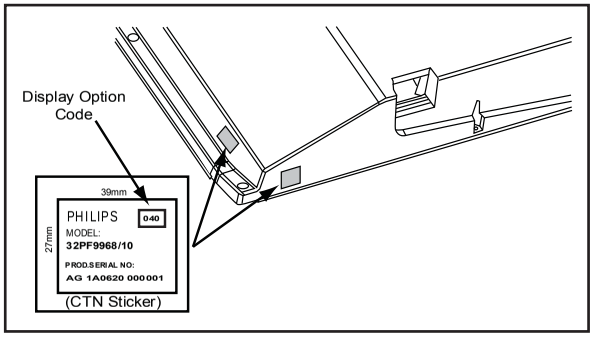
How to Activate SAM

Via a standard RC transmitter: Key in the code "062596" directly followed by the "INFO" or "OK" button. After activating SAM with this method a service warning will appear on the screen, continue by pressing the "OK" button on the RC.

Contents of SAM

- **Hardware Info.**
  - **A. SW Version.** Displays the software version of the main software (**example:** Q555X-1.2.3.4 = AAAAB_X.Y.W.Z).
    - **AAAA=** the chassis name.
    - **B=** the SW branch version. This is a sequential number (this is no longer the region indication, as the software is now multi-region).
    - **X.Y.W.Z=** the software version, where X is the main version number (different numbers are not compatible with one another) and Y.W.Z is the sub version number (a higher number is always compatible with a lower number).
  - **B. STBY PROC Version.** Displays the software version of the stand-by processor.
  - **C. Production Code**. Displays the production code of the TV, this is the serial number as printed on the back of the TV set. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM. ComPair will foresee in a possibility to do this.
- **Operation Hours.** Displays the accumulated total of operation hours (not the stand-by hours). Every time the TV is switched “on/off”, 0.5 hours is added to this number.
- **Errors** (followed by maximum 10 errors). The most recent error is displayed at the upper left (for an error explanation see section “5.5 Error Codes”).
- **Reset Error Buffer.** When “cursor right” (or “OK” button) pressed here, followed by the “OK” button, the error buffer is reset.
- **Alignments.** This will activate the “ALIGNMENTS” sub-menu. See Chapter 6. Alignments.
- **Dealer Options.** Extra features for the dealers.
- **Options.** Extra features for Service. For more info regarding option codes, see chapter 6. Alignments. Note that if the option code numbers are changed, these have to be confirmed with pressing the “OK” button before the options are stored, otherwise changes will be lost.
- **Initialize NVM.** The moment the processor recognizes a corrupted NVM, the “initialize NVM” line will be highlighted. Now, two things can be done (dependent of the service instructions at that moment):
  - Save the content of the NVM via ComPair for development analysis, **before** initializing. This will give the Service department an extra possibility for diagnosis (e.g. when Development asks for this).
  - Initialize the NVM.

Note: When the NVM is corrupted, or replaced, there is a high possibility that no picture appears because the display code is not correct. So, before initializing the NVM via the SAM, a picture is necessary and therefore the correct display option has to be entered. Refer to Chapter 6. Alignments for details. To adapt this option, it’s advised to use ComPair (the correct values for the options can be found in Chapter 6. Alignments) or a method via a standard RC (described below).
Changing the display option via a standard RC: Key in the code “062598” directly followed by the “MENU” (or "HOME") button and “XXX” (where XXX is the 3 digit decimal display code as mentioned on the sticker in the set). Make sure to key in all three digits, also the leading zero’s. If the above action is successful, the front LED will go out as an indication that the RC sequence was correct. After the display option is changed in the NVM, the TV will go to the Stand-by mode. If the NVM was corrupted or empty before this action, it will be initialized first (loaded with default values). This initializing can take up to 20 seconds.



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090819

Figure 5-2 Location of Display Option Code sticker

- **Store - go right.** All options and alignments are stored when pressing “cursor right” (or the “OK” button) and then the “OK”-button.
- **Operation hours display.** Displays the accumulated total of operation hours of the screen itself. In case of a display replacement, reset to “0” or to the consumed operation hours of the spare display.
- **SW Maintenance.**
  - **SW Events.** In case of specific software problems, the development department can ask for this info.
  - **HW Events.** In case of specific software problems, the development department can ask for this info :
    - Event 26: refers to a power dip, this is logged after the TV set reboots due to a power dip.
    - Event 17: refers to the power OK status, sensed even before the 3 x retry to generate the error code.
- **Test settings.** For development purposes only.
- **Development file versions.** Not useful for Service purposes, this information is only used by the development department.
- **Upload to USB.** To upload several settings from the TV to an USB stick, which is connected to the SSB. The items are “Channel list”, “Personal settings”, “Option codes”, “Alignments”, “Identification data” (includes the set type and prod code + all 12NC like SSB, display, boards), “History list”. The “All” item supports to upload all several items at once.
  First a directory “repair\” has to be created in the root of the USB stick.
  To upload the settings, select each item separately, press “cursor right” (or the “OK” button), confirm with “OK” and wait until the message “Done” appears. In case the download to the USB stick was not successful, “Failure” will be displayed. In this case, check if the USB stick is connected properly and if the directory “repair” is present in the root of the USB stick. Now the settings are stored onto the USB stick and can be used to download into another TV or other SSB. Uploading is of course only possible if the software is running and preferably a picture is available. This method is created to be able to save the customer’s TV settings and to store them into another SSB.
- **Download from USB.** To download several settings from the USB stick to the TV, same way of working needs to be followed as described in “Upload to USB”. To make sure that the download of the channel list from USB to the TV is executed properly, it is necessary to restart the TV and tune to a valid preset if necessary. The “All” item supports to download all several items at once.
- **NVM editor.** For NET TV the set “type number” must be entered correctly.
  Also the production code (AG code) can be entered here via the RC-transmitter.
  Correct data can be found on the side/rear sticker.

How to Navigate

- In SAM, the menu items can be selected with the "CURSOR UP/DOWN" key on the RC-transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the "CURSOR UP/DOWN" key to display the next/previous menu items.
- With the "CURSOR LEFT/RIGHT" keys, it is possible to:
  - (De) activate the selected menu item.
  - (De) activate the selected sub menu.
- With the "OK" key, it is possible to activate the selected action.

How to Exit SAM

Use one of the following methods:

- Switch the TV set to STAND-BY via the RC-transmitter.
- Via a standard RC-transmitter, key in "00" sequence, or select the "BACK" key.

5.2.3 Customer Service Mode (CSM)

Purpose

When a customer is having problems with his TV-set, he can call his dealer or the Customer Helpdesk. The service technician can then ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a read only mode; therefore, modifications in this mode are not possible.

When in this chassis CSM is activated, a test pattern will be displayed during 5 seconds (1 second Blue, 1 second Green and 1 second Red, then again 1 second Blue and 1 second Green). This test pattern is generated by the PNX51X0 (located on the 200Hz board as part of the display). So if this test pattern is shown, it could be determined that the back end video chain (PNX51X0 and display) is working.For TV sets without the PNX51X0 inside, every menu from CSM will be used as check for the back end chain video.

When CSM is activated **and** there is a USB stick connected to the TV set, the software will dump the CSM content to the USB stick. The file (CSM_model number_serial number.txt) will be saved in the root of the USB stick. This info can be handy if no information is displayed.

When in CSM mode (and a USB stick connected), pressing "OK" will create an **extended CSM dump** file on the USB stick. This file (Extended_CSM_model number_serial number.txt) contains:

- The normal CSM dump information,
- All items (from SAM "load to USB", but in readable format),
- Operating hours,
- Error codes,
- SW/HW event logs.

To have fast feedback from the field, a flashdump can be requested by development. When in CSM, push the "red" button and key in serial digits '2679' (same keys to form the word 'COPY' with a cellphone). A file "Dump_model number_serial number.bin" will be written on the connected USB device. This can take 1/2 minute, depending on the quantity of data that needs to be dumped.

Also when CSM is activated, the LAYER 1 error is displayed via blinking LED. Only the latest error is displayed (see also section 5.5 Error Codes).

How to Activate CSM

Key in the code "123654" via the standard RC transmitter.
Note: Activation of the CSM is only possible if there is no (user) menu on the screen!

How to Navigate

By means of the "CURSOR-DOWN/UP" knob on the RC-transmitter, can be navigated through the menus.

Contents of CSM

The contents are reduced to 3 pages: General, Software versions and Quality items. The group names itself are not shown anywhere in the CSM menu.

General

- **Set Type.** This information is very helpful for a helpdesk/ workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM. ComPair will foresee in a possibility to do this. The update can also be done via the NVM editor available in SAM.
- **Production Code.** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM. ComPair will foresee in a possibility to do this. The update can also be done via the NVM editor available in SAM.
- **Installed date.** Indicates the date of the first installation of the TV. This date is acquired via time extraction.
- **Options 1.** Gives the option codes of option group 1 as set in SAM (Service Alignment Mode).
- **Options 2.** Gives the option codes of option group 2 as set in SAM (Service Alignment Mode).
- **12NC SSB.** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. ComPair will foresee in a possibility to do this. This identification number is the 12nc number of the SSB.
- **12NC display.** Shows the 12NC of the display.
- **12NC supply.** Shows the 12NC of the power supply.
- **12NC 200Hz board.** Shows the 12NC of the 200Hz Panel (when present).
- **12NC AV PIP.** Shows the 12NC of the AV PIP board (when present).

Software versions

- **Current main SW.** Displays the build-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the Internet.
  Example: Q55xx1.2.3.4
- **Stand-by SW.** Displays the build-in stand-by processor software version. Upgrading this software will be possible via ComPair or via USB (see section 5.9 Software Upgrading).
  Example: STDBY_83.84.0.0.
- **e-UM version.** Displays the electronic user manual SW-version (12NC version number). Most significant number here is the last digit.
- **AV PIP software.**
- **3D dongle software version.**

Quality items

- **Signal quality.** Bad / average /good (not for DVB-S).
- **Ethernet MAC address.** Displays the MAC address present in the SSB.
- **Wireless MAC address.** Displays the wireless MAC address to support the Wi-Fi functionality.
- **BDS key.** Indicates if the set is in the BDS status.
- **CI module.** Displays status if the common interface module is detected.
- **CI + protected service.** Yes/No.
- **Event counter** :
  S : 000X 0000(number of software recoveries : SW EVENT-LOG #(reboots)
  S : 0000 000X (number of software events : SW EVENT-LOG #(events)
  H : 000X 0000(number of hardware errors)

H : 0000 000X (number of hardware events : SW EVENT-LOG #(events).

How to Exit CSM

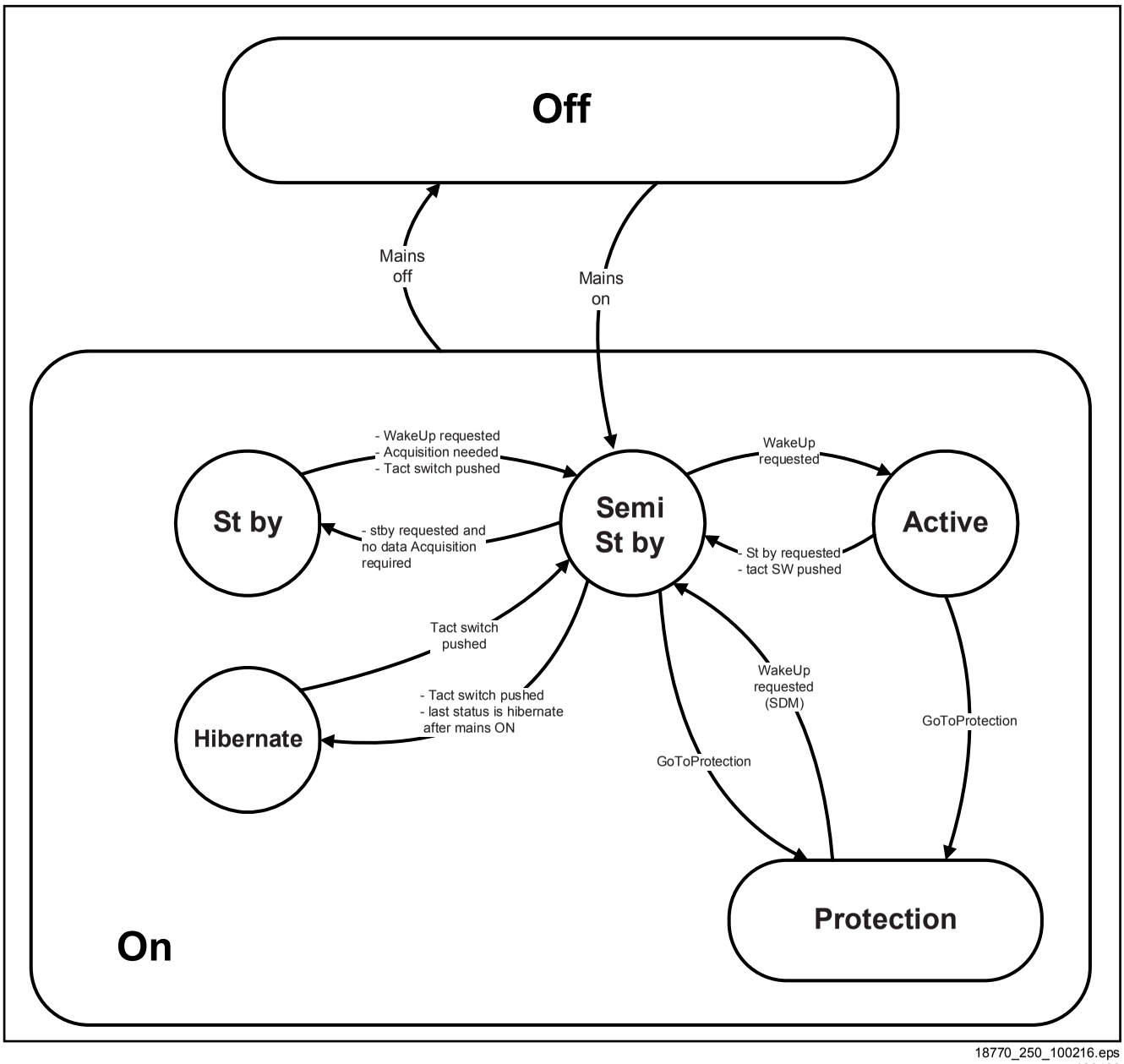
Press “MENU” (or "HOME") / “Back” key on the RC-transmitter.

5.3 Stepwise Start-up

When the TV is in a protection state due to an error detected by stand-by software (error blinking is displayed) **and** SDM is activated via shortcutting the SDM solder path on the SSB, the TV starts up until it reaches the situation just before protection. So, this is a kind of automatic stepwise start-up. In combination with the start-up diagrams below, you can see which supplies are present at a certain moment. Caution: in case the start-up in this mode with a faulty FET 7U0X is done, you can destroy all IC’s supplied by the +1V8 and +1v1, due to overvoltage (12V on XVX-line). It is recommended to measure first the FET 7U0X or others FET’s on shortcircuit before activating SDM via the service pads.

The abbreviations “SP” and “MP” in the figures stand for:

- SP: protection or error detected by the **S**tand-by **P**rocessor.
- MP: protection or error detected by the MIPS **M**ain **P**rocessor.



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100402

Figure 5-3 Transition diagram

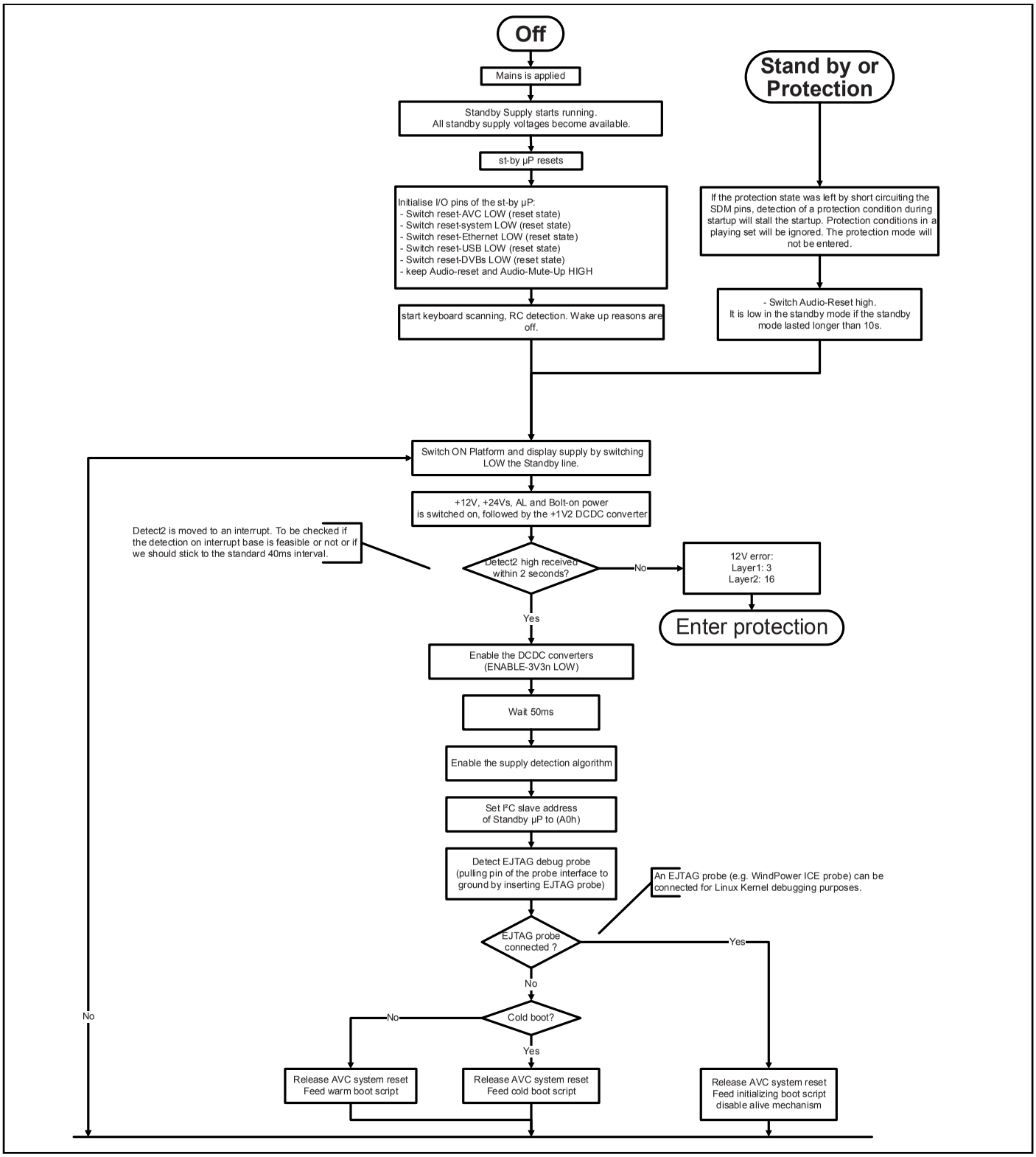
Off
Mains is applied
Standby Supply starts running.
All standby supply voltages become available.
st-by µP resets
Initialise I/O pins of the st-by µP:
- Switch reset-AVC LOW (reset state)
- Switch reset-system LOW (reset state)
- Switch reset-Ethernet LOW (reset state)
- Switch reset-USB LOW (reset state)
- Switch reset-DVBs LOW (reset state)
- keep Audio-reset and Audio-Mute-Up HIGH
start keyboard scanning, RC detection. Wake up reasons are off.
Stand by or Protection
If the protection state was left by short circuiting the SDM pins, detection of a protection condition during startup will stall the startup. Protection conditions in a playing set will be ignored. The protection mode will not be entered.
- Switch Audio-Reset high.
It is low in the standby mode if the standby mode lasted longer than 10s.
Switch ON Platform and display supply by switching LOW the Standby line.
+12V, +24Vs, AL and Bolt-on power is switched on, followed by the +1V2 DCDC converter
Detect2 is moved to an interrupt. To be checked if the detection on interrupt base is feasible or not or if we should stick to the standard 40ms interval.
Detect2 high received within 2 seconds?
No
12V error:
Layer1: 3
Layer2: 16
Enter protection
Yes
Enable the DCDC converters (ENABLE-3V3n LOW)
Wait 50ms
Enable the supply detection algorithm
Set I²C slave address of Standby µP to (A0h)
Detect EJTAG debug probe (pulling pin of the probe interface to ground by inserting EJTAG probe)
An EJTAG probe (e.g. WindPower ICE probe) can be connected for Linux Kernel debugging purposes.
EJTAG probe connected ?
Yes
No
Cold boot?
No
Yes
No
Release AVC system reset
Feed warm boot script
Release AVC system reset
Feed cold boot script
Release AVC system reset
Feed initializing boot script
disable alive mechanism

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Figure 5-4 “Off” to “Semi Stand-by” flowchart (part 1)

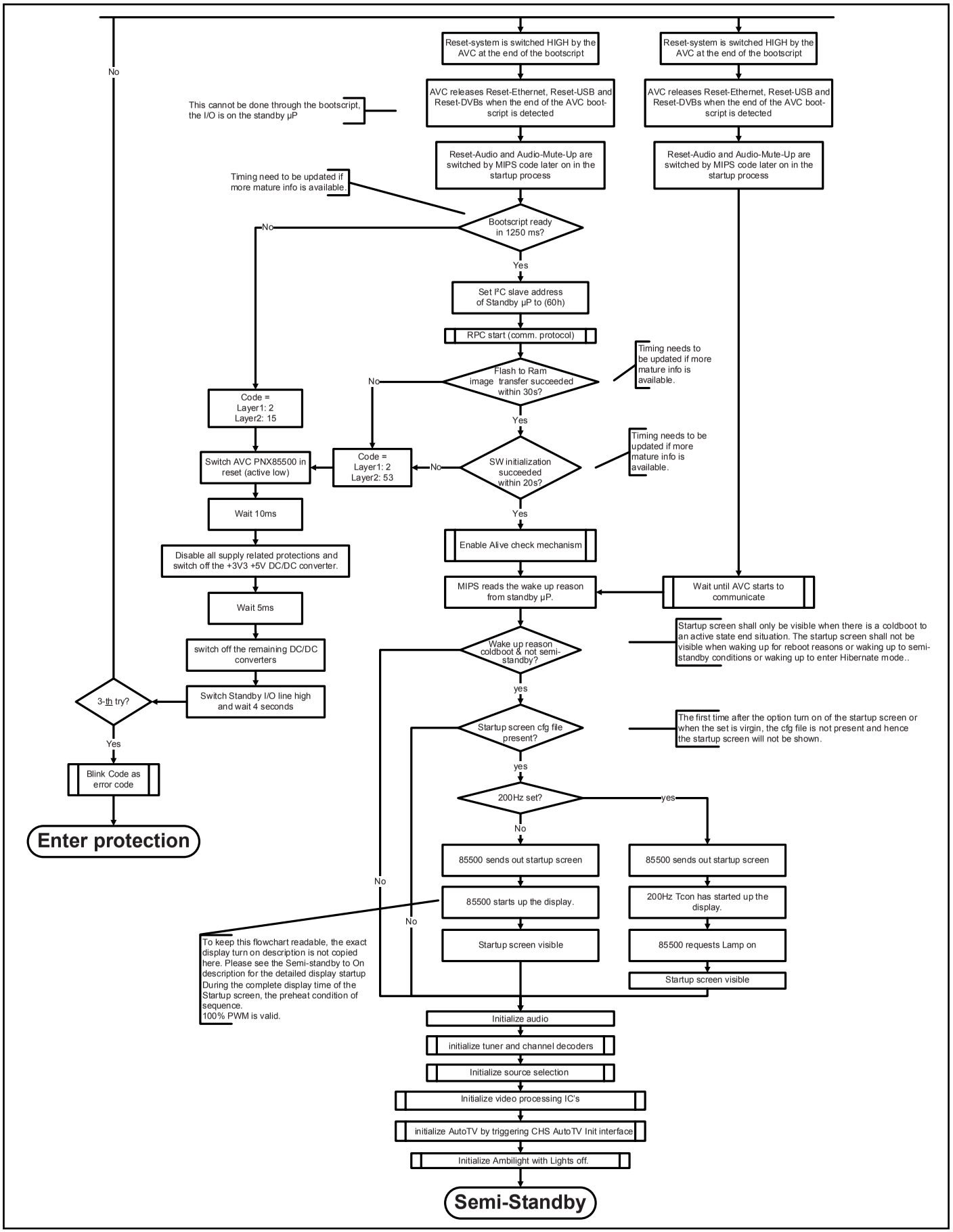
Reset-system is switched HIGH by the AVC at the end of the bootscript
Reset-system is switched HIGH by the AVC at the end of the bootscript
No
This cannot be done through the bootscript, the I/O is on the standby µP
AVC releases Reset-Ethernet, Reset-USB and Reset-DVBs when the end of the AVC boot-script is detected
AVC releases Reset-Ethernet, Reset-USB and Reset-DVBs when the end of the AVC boot-script is detected
Reset-Audio and Audio-Mute-Up are switched by MIPS code later on in the startup process
Reset-Audio and Audio-Mute-Up are switched by MIPS code later on in the startup process
Timing need to be updated if more mature info is available.
Bootscript ready in 1250 ms?
No
Yes
Set I²C slave address of Standby µP to (60h)
RPC start (comm. protocol)
Timing needs to be updated if more mature info is available.
Flash to Ram image transfer succeeded within 30s?
No
Yes
Code = Layer1: 2 Layer2: 15
Timing needs to be updated if more mature info is available.
Switch AVC PNX85500 in reset (active low)
Code = Layer1: 2 Layer2: 53
No
SW initialization succeeded within 20s?
Wait 10ms
Yes
Enable Alive check mechanism
Disable all supply related protections and switch off the +3V3 +5V DC/DC converter.
MIPS reads the wake up reason from standby µP.
Wait until AVC starts to communicate
Wait 5ms
Startup screen shall only be visible when there is a coldboot to an active state end situation. The startup screen shall not be visible when waking up for reboot reasons or waking up to semi-standby conditions or waking up to enter Hibernate mode..
switch off the remaining DC/DC converters
Wake up reason coldboot & not semi-standby?
yes
3-th try?
Switch Standby I/O line high and wait 4 seconds
Startup screen cfg file present?
The first time after the option turn on of the startup screen or when the set is virgin, the cfg file is not present and hence the startup screen will not be shown.
yes
Yes
Blink Code as error code
200Hz set?
yes
No
Enter protection
85500 sends out startup screen
85500 sends out startup screen
No
85500 starts up the display.
200Hz Tcon has started up the display.
No
Startup screen visible
85500 requests Lamp on
To keep this flowchart readable, the exact display turn on description is not copied here. Please see the Semi-standby to On description for the detailed display startup During the complete display time of the Startup screen, the preheat condition of sequence.
100% PWM is valid.
Startup screen visible
Initialize audio
initialize tuner and channel decoders
Initialize source selection
Initialize video processing IC's
initialize AutoTV by triggering CHS AutoTV Init interface
Initialize Ambilight with Lights off.
Semi-Standby

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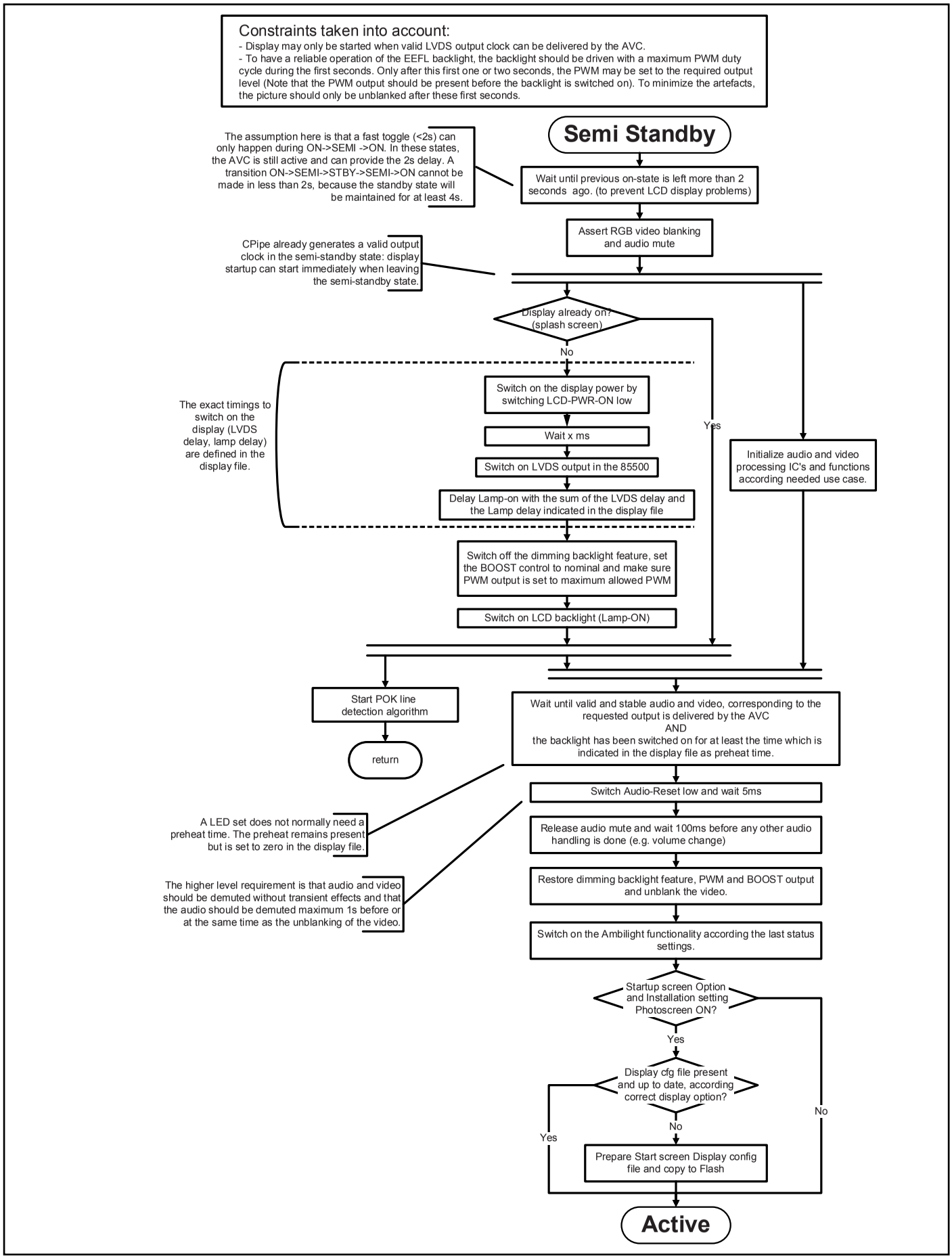
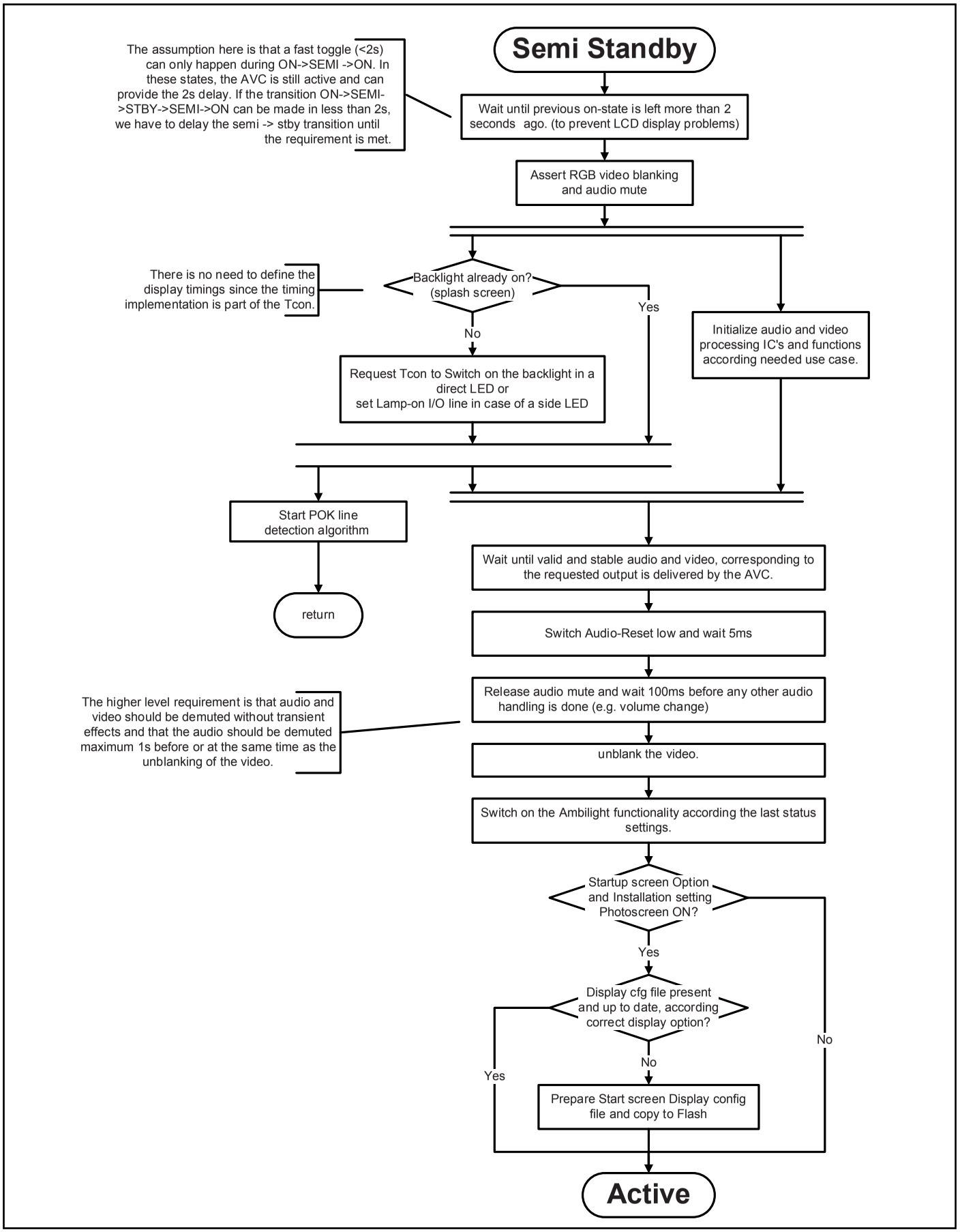
Figure 5-5 "Off" to "Semi Stand-by" flowchart (part 2)


Constraints taken into account:
- Display may only be started when valid LVDS output clock can be delivered by the AVC.
- To have a reliable operation of the EEFL backlight, the backlight should be driven with a maximum PWM duty cycle during the first seconds. Only after this first one or two seconds, the PWM may be set to the required output level (Note that the PWM output should be present before the backlight is switched on). To minimize the artefacts, the picture should only be unblanked after these first seconds.
Semi Standby
The assumption here is that a fast toggle (<2s) can only happen during ON->SEMI ->ON. In these states, the AVC is still active and can provide the 2s delay. A transition ON->SEMI->STBY->SEMI->ON cannot be made in less than 2s, because the standby state will be maintained for at least 4s.
Wait until previous on-state is left more than 2 seconds ago. (to prevent LCD display problems)
Assert RGB video blanking and audio mute
CPipe already generates a valid output clock in the semi-standby state: display startup can start immediately when leaving the semi-standby state.
Display already on? (splash screen)
Yes
No
The exact timings to switch on the display (LVDS delay, lamp delay) are defined in the display file.
Switch on the display power by switching LCD-PWR-ON low
Wait x ms
Switch on LVDS output in the 85500
Delay Lamp-on with the sum of the LVDS delay and the Lamp delay indicated in the display file
Initialize audio and video processing IC's and functions according needed use case.
Switch off the dimming backlight feature, set the BOOST control to nominal and make sure PWM output is set to maximum allowed PWM
Switch on LCD backlight (Lamp-ON)
Start POK line detection algorithm
return
Wait until valid and stable audio and video, corresponding to the requested output is delivered by the AVC
AND
the backlight has been switched on for at least the time which is indicated in the display file as preheat time.
A LED set does not normally need a preheat time. The preheat remains present but is set to zero in the display file.
Switch Audio-Reset low and wait 5ms
Release audio mute and wait 100ms before any other audio handling is done (e.g. volume change)
The higher level requirement is that audio and video should be demuted without transient effects and that the audio should be demuted maximum 1s before or at the same time as the unblanking of the video.
Restore dimming backlight feature, PWM and BOOST output and unblank the video.
Switch on the Ambilight functionality according the last status settings.
Startup screen Option and Installation setting Photoscreen ON?
Yes
No
Display cfg file present and up to date, according correct display option?
Yes
No
Prepare Start screen Display config file and copy to Flash
Active

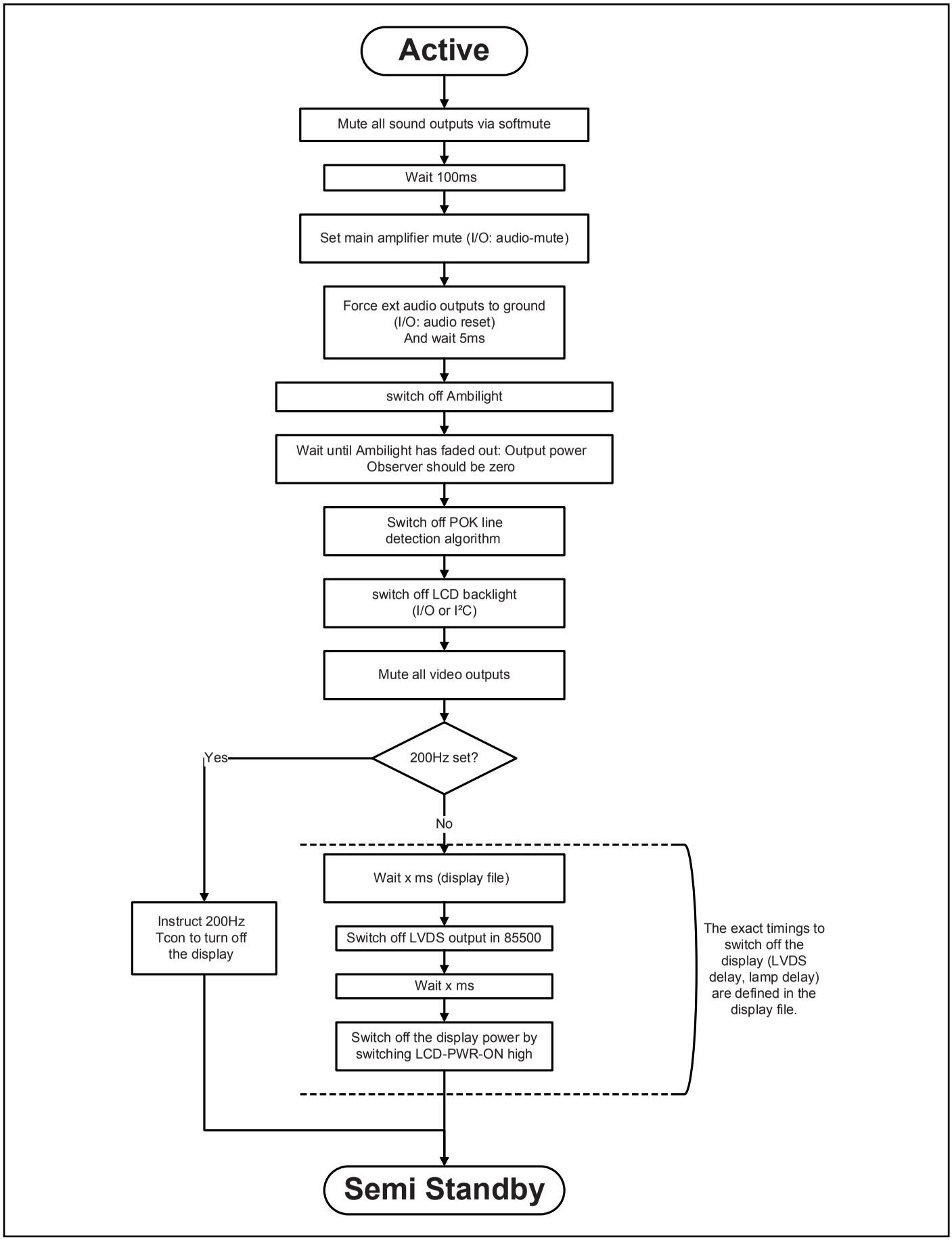
18770_253_100216.eps
100216

Figure 5-6 “Semi Stand-by” to “Active” flowchart (EEFL or LED backlight 50/100 Hz only)


Semi Standby
The assumption here is that a fast toggle (<2s) can only happen during ON->SEMI ->ON. In these states, the AVC is still active and can provide the 2s delay. If the transition ON->SEMI->STBY->SEMI->ON can be made in less than 2s, we have to delay the semi -> stby transition until the requirement is met.
Wait until previous on-state is left more than 2 seconds ago. (to prevent LCD display problems)
Assert RGB video blanking and audio mute
There is no need to define the display timings since the timing implementation is part of the Tcon.
Backlight already on? (splash screen)
Yes
No
Request Tcon to Switch on the backlight in a direct LED or set Lamp-on I/O line in case of a side LED
Initialize audio and video processing IC's and functions according needed use case.
Start POK line detection algorithm
return
Wait until valid and stable audio and video, corresponding to the requested output is delivered by the AVC.
Switch Audio-Reset low and wait 5ms
Release audio mute and wait 100ms before any other audio handling is done (e.g. volume change)
The higher level requirement is that audio and video should be demuted without transient effects and that the audio should be demuted maximum 1s before or at the same time as the unblanking of the video.
unblank the video.
Switch on the Ambilight functionality according the last status settings.
Startup screen Option and Installation setting Photoscreen ON?
Yes
No
Display cfg file present and up to date, according correct display option?
Yes
No
Prepare Start screen Display config file and copy to Flash
Active

18770_254_100216.eps
100216

Figure 5-7 “Semi Stand-by” to “Active” flowchart (LED backlight 200 Hz)



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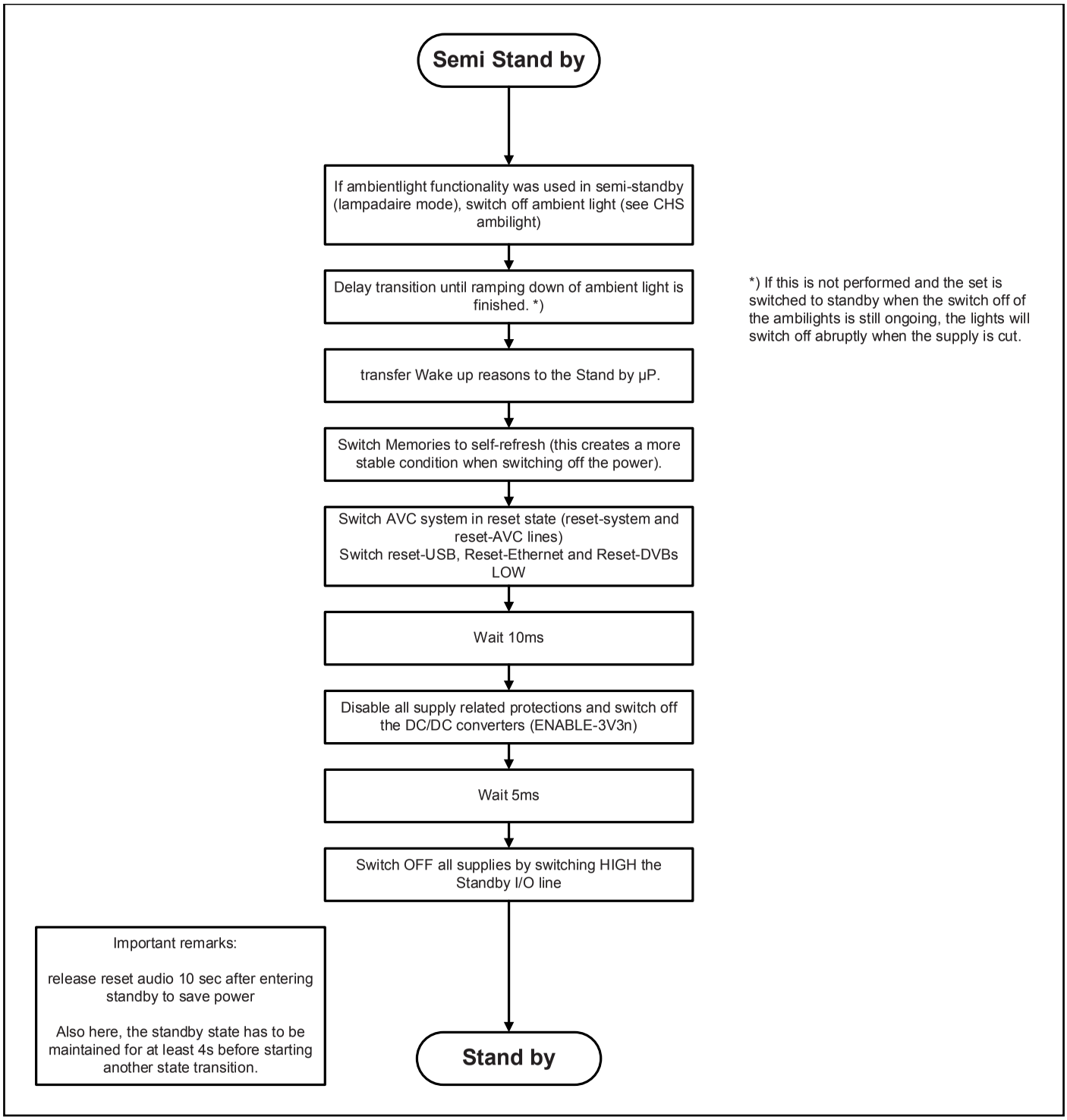
100216

Figure 5-8 “Active” to “Semi Stand-by” flowchart


Semi Stand by
If ambientlight functionality was used in semi-standby (lampadaire mode), switch off ambient light (see CHS ambilight)
Delay transition until ramping down of ambient light is finished. *)
transfer Wake up reasons to the Stand by µP.
Switch Memories to self-refresh (this creates a more stable condition when switching off the power).
Switch AVC system in reset state (reset-system and reset-AVC lines)
Switch reset-USB, Reset-Ethernet and Reset-DVBs LOW
Wait 10ms
Disable all supply related protections and switch off the DC/DC converters (ENABLE-3V3n)
Wait 5ms
Switch OFF all supplies by switching HIGH the Standby I/O line
Stand by
*) If this is not performed and the set is switched to standby when the switch off of the ambilights is still ongoing, the lights will switch off abruptly when the supply is cut.
Important remarks:
release reset audio 10 sec after entering standby to save power
Also here, the standby state has to be maintained for at least 4s before starting another state transition.

18770_256_100216.eps
100216

Figure 5-9 “Semi Stand-by” to “Stand-by” flowchart

5.4 Service Tools

5.4.1 ComPair

Introduction

ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products. and offers the following:

1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I²C or UART commands is necessary, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the µP is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

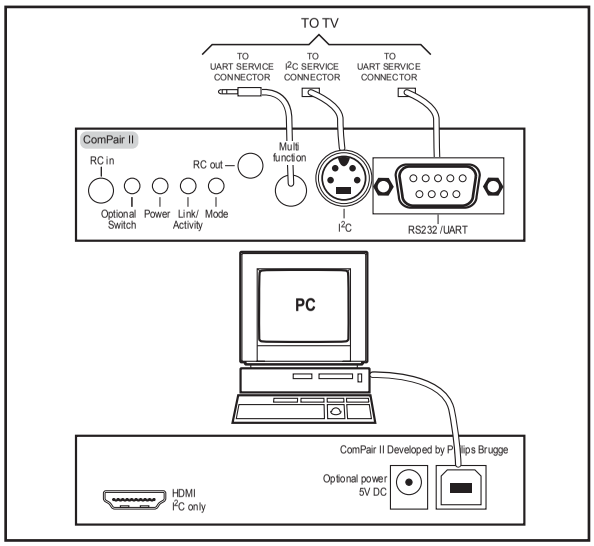
Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair II interface box is connected **to the PC** via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

How to Connect

This is described in the chassis fault finding database in ComPair.



10000_036_090121.eps
091118

Figure 5-10 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs can be blown!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for Q55x.x. (using 3.5 mm Mini Jack connector): 3138 188 75051.

Note: When you encounter problems, contact your local support desk.

5.5 Error Codes

5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.

When an error occurs, it is added to the list of errors, provided the list is not full. When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained).

To prevent that an occasional error stays in the list forever, the error is removed from the list after more than 50 hrs. of operation.

When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

New in this chassis is the way errors can be displayed:

- **If no errors are there, the LED should not blink at all in CSM or SDM. No spacer must be displayed as well.**
- **There is a simple blinking LED procedure for board level repair (home repair) so called LAYER 1 errors** next to the existing errors which are LAYER 2 errors (see Table 5-2).
  - LAYER 1 errors are one digit errors.
  - LAYER 2 errors are 2 digit errors.
- **In protection mode**.
  - From consumer mode: **LAYER 1.**
  - From SDM mode: **LAYER 2**.
- **Fatal errors, if I2C bus is blocked and the set reboots, CSM and SAM are not selectable**.
  - From consumer mode: **LAYER 1.**
  - From SDM mode: **LAYER 2**.
- In CSM mode.
  - When entering CSM: error **LAYER 1** will be displayed by blinking LED. Only the latest error is shown.
- In SDM mode.
  - When SDM is entered via Remote Control code or the hardware pins, **LAYER 2** is displayed via blinking LED.
- Error display on screen.
  - In CSM no error codes are displayed on screen.
  - In SAM the complete error list is shown.

Basically there are three kinds of errors:

- **Errors detected by the Stand-by software which lead to protection.** These errors will always lead to protection and an automatic start of the blinking LED LAYER 1 error. (see section "5.6 The Blinking LED Procedure").
- **Errors detected by the Stand-by software which not lead to protection.** In this case the front LED should blink the involved error. See also section "5.5 Error Codes, 5.5.4 Error Buffer". Note that it can take up several minutes before the TV starts blinking the error (e.g. LAYER 1 error = 2, LAYER 2 error = 15 or 53).
- **Errors detected by main software (MIPS).** In this case the error will be logged into the error buffer and can be read out via ComPair, via blinking LED method LAYER 1-2 error, or in case picture is visible, via SAM.

5.5.2 How to Read the Error Buffer

Use one of the following methods:

- On screen via the SAM (only when a picture is visible). E.g.:
  - **00 00 00 00 00**: No errors detected
  - **23 00 00 00 00**: Error code 23 is the last and only detected error.
  - **37 23 00 00 00**: Error code 23 was first detected and error code 37 is the last detected error.
  - **Note that no protection errors can be logged in the error buffer.**

- Via the blinking LED procedure. See section 5.5.3 How to Clear the Error Buffer.
- Via ComPair.

5.5.3 How to Clear the Error Buffer

Use one of the following methods:
- By activation of the "RESET ERROR BUFFER" command in the SAM menu.
- If the content of the error buffer has not changed for 50+ hours, it resets automatically.

5.5.4 Error Buffer

In case of non-intermittent faults, clear the error buffer before starting to repair (**before** clearing the buffer, write down the content, as this history can give significant information). This to ensure that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g. a fault in the protection detection circuitry can also lead to a protection).
There are several mechanisms of error detection:
- Via error bits in the status registers of ICs.
- Via polling on I/O pins going to the stand-by processor.
- Via sensing of analog values on the stand-by processor or the PNX8550.
- Via a "not acknowledge" of an I^2C communication.

Take notice that some errors need several minutes before they start blinking or before they will be logged. So in case of problems wait 2 minutes from start-up onwards, and then check if the front LED is blinking or if an error is logged.

Table 5-2 Error code overview

Description	Layer 1	Layer 2	Monitored by	Error/ Prot	Error Buffer/ Blinking LED	Device	Defective Board
I^2C3	2	13	MIPS	E	BL / EB	SSB	SSB
I^2C2	2	14	MIPS	E	BL / EB	SSB	SSB
I^2C4	2	18	MIPS	E	BL / EB	SSB	SSB
PNX doesn't boot (HW cause)	2	15	Stby µP	P	BL	PNX8550	SSB
12V	3	16	Stby µP	P	BL	/	Supply
Inverter or display supply	3	17	MIPS	E	EB	/	Supply
PNX51X0	2/9	21	MIPS	E	EB	PNX51X0	200 Hz board
HDMI mux	2	23	MIPS	E	EB	Sil9x87A	SSB
I2C switch	2	24	MIPS	E	EB	PCA9540	SSB
Channel dec DVB-S	2	28	MIPS	E	EB	STV0903	SSB
Lnb controller	2	31	MIPS	E	EB	LNBH23	SSB
Tuner	2	34	MIPS	E	EB	DTT 71300	SSB
Main nvm	2	35	MIPS	E	EB	STM24C64	SSB
Tuner DVB-S	2	36	MIPS	E	EB	STV6110	SSB
T° sensor SSB/set	2	42	MIPS	E	EB	LM 75	T° sensor
T° sensor LED driver/Tcon	7	42	MIPS	E	EB	LM 75	T° sensor
PNX doesn't boot (SW cause)	2	53	Stby µP	P	BL	PNX8550	SSB
Display	5	64	MIPS	E	BL / EB	Altera	Display

Extra Info
- **Rebooting.** When a TV is constantly rebooting due to internal problems, most of the time no errors will be logged or blinked. This rebooting can be recognized via a ComPair interface and Hyperterminal (for Hyperterminal settings, see section "5.8 Fault Finding and Repair Tips, 5.8.7 Logging). It's shown that the loggings which are generated by the main software keep continuing. In this case diagnose has to be done via ComPair.
- **Error 13 (I^2C bus 3, SSB bus blocked)**. Current situation: when this error occurs, the TV will constantly reboot due to the blocked bus. The best way for further diagnosis here, is to use ComPair.
- **Error 14 (I^2C bus 2, TV set bus blocked)**. Current situation: when this error occurs, the TV will constantly reboot due to the blocked bus. The best way for further diagnosis here, is to use ComPair.
- **Error 18 (I^2C bus 4, Tuner bus blocked)**. In case this bus is blocked, short the "SDM" solder paths on the SSB during startup, LAYER error 2 = 18 will be blinked.
- **Error 15 (PNX8550 doesn't boot)**. Indicates that the main processor was not able to read his bootscript. This error will point to a hardware problem around the PNX8550 (supplies not OK, PNX 8550 completely dead, I^2C link between PNX and Stand-by Processor broken, etc...). When error 15 occurs it is also possible that I^2C1 bus is blocked (NVM). I^2C1 can be indicated in the schematics as follows: SCL-UP-MIPS, SDA-UP-MIPS.

  Other root causes for this error can be due to hardware problems regarding the DDR's and the bootscript reading from the PNX8550.
- **Error 16 (12V)**. This voltage is made in the power supply and results in protection (LAYER 1 error = 3) in case of absence. When SDM is activated we see blinking LED LAYER 2 error = 16.
- **Error 17 (Invertor or Display Supply)**. Here the status of the "Power OK" is checked by software, no protection will occur during failure of the invertor or display supply (no picture), only error logging. LED blinking of LAYER 1 error = 3 in CSM, in SDM this gives LAYER 2 error = 17.
- **Error 21 (PNX51X0)**. When there is no I^2C communication towards the PNX51X0 after start-up, LAYER 2 error = 21 will be logged and displayed via the blinking LED procedure if SDM is switched on. This device is located on the 200 Hz panel from the display.
- **Error 23 (HDMI)**. When there is no I^2C communication towards the HDMI mux after start-up, LAYER 2 error = 23 will be logged and displayed via the blinking LED procedure if SDM is switched on.
- **Error 24 (I2C switch)**. When there is no I^2C communication towards the I^2C switch, LAYER 2 error = 24 will be logged and displayed via the blinking LED procedure when SDM is switched on. Remark: this only works for TV sets with an I^2C controlled screen included.
- **Error 28 (Channel dec DVB-S)**. When there is no I^2C communication towards the DVB-S channel decoder,

LAYER 2 error = 28 will be logged and displayed via the blinking LED procedure if SDM is switched on.
- **Error 31 (Lnb controller)**. When there is no I²C communication towards this device, LAYER 2 error = 31 will be logged and displayed via the blinking LED procedure if SDM is activated.
- **Error 34 (Tuner)**. When there is no I²C communication towards the tuner during start-up, LAYER 2 error = 34 will be logged and displayed via the blinking LED procedure when SDM is switched on.
- **Error 35 (main NVM)**. When there is no I²C communication towards the main NVM during start-up, LAYER 2 error = 35 will be displayed via the blinking LED procedure when SDM is switched "on". All service modes (CSM, SAM and SDM) are accessible during this failure, observed in the Uart logging as follows: "<< ERRO >>> PFPOW_.C: First Error (id19, Layer_1= 2 Layer_= 35)".
- **Error 36 (Tuner DVB-S)**. When there is no I²C communication towards the DVB-S tuner during start-up, LAYER 2 error = 36 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 42 (Temp sensor)**. Only applicable for TV sets equipped with temperature devices.
- **Error 53**. This error will indicate that the PNX8550 has read his bootscript (when this would have failed, error 15 would blink) but initialization was never completed because of hardware problems (NAND flash, ...) or software initialization problems. Possible cause could be that there is no valid software loaded (try to upgrade to the latest main software version). Note that it can take a few minutes before the TV starts blinking LAYER 1 error = 2 or in SDM, LAYER 2 error = 53.
- **Error 64**. Only applicable for TV sets with an I²C controlled screen.

5.6 The Blinking LED Procedure

5.6.1 Introduction

The blinking LED procedure can be split up into two situations:
- **Blinking LED procedure LAYER 1 error.** In this case the error is automatically blinked when the TV is put in CSM. This will be only one digit error, namely the one that is referring to the defective board (see table "5-2 Error code overview") which causes the failure of the TV. This approach will especially be used for home repair and call centres. The aim here is to have service diagnosis from a distance.
- **Blinking LED procedure LAYER 2 error.** Via this procedure, the contents of the error buffer can be made visible via the front LED. In this case the error contains 2 digits (see table "5-2 Error code overview") and will be displayed when SDM (hardware pins) is activated. This is especially useful for fault finding and gives more details regarding the failure of the defective board.

Important remark:
For an empty error buffer, the LED should not blink at all in CSM or SDM. No spacer will be displayed.

When one of the blinking LED procedures is activated, the front LED will show (blink) the contents of the error buffer. Error codes greater then 10 are shown as follows:
1. "n" long blinks (where "n" = 1 to 9) indicating decimal digit
2. A pause of 1.5 s
3. "n" short blinks (where "n"= 1 to 9)
4. A pause of approximately 3 s,
5. When all the error codes are displayed, the sequence finishes with a LED blink of 3 s (spacer).
6. The sequence starts again.

Example: Error 12 8 6 0 0.
After activation of the SDM, the front LED will show:
1. One long blink of 750 ms (which is an indication of the decimal digit) followed by a pause of 1.5 s
2. Two short blinks of 250 ms followed by a pause of 3 s
3. Eight short blinks followed by a pause of 3 s
4. Six short blinks followed by a pause of 3 s
5. One long blink of 3 s to finish the sequence (spacer).
6. The sequence starts again.

5.6.2 How to Activate

Use one of the following methods:
- **Activate the CSM**. The blinking front LED will show only the latest layer 1 error, this works in "normal operation" mode or automatically when the error/protection is monitored by the Stand-by processor.
  In case no picture is shown and there is no LED blinking, read the logging to detect whether "error devices" are mentioned. (see section "5.8 Fault Finding and Repair Tips, 5.8.7 Logging").
- **Activate the SDM**. The blinking front LED will show the entire content of the LAYER 2 error buffer, this works in "normal operation" mode or when SDM (via hardware pins) is activated when the tv set is in protection.

5.7 Protections

5.7.1 Software Protections

Most of the protections and errors use either the stand-by microprocessor or the MIPS controller as detection device. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as software protections. There are several types of software related protections, solving a variety of fault conditions:
- **Related to supplies:** presence of the +5V, +3V3 and 1V2 needs to be measured, no protection triggered here.
- **Protections related to breakdown of the safety check mechanism.** E.g. since the protection detections are done by means of software, failing of the software will have to initiate a protection mode since safety cannot be guaranteed any more.

Remark on the Supply Errors
The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set. If the supply is still missing after the reboot, the TV will go to protection.

Protections during Start-up
During TV start-up, some voltages and IC observers are actively monitored to be able to optimise the start-up speed, and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection. As the observers are only used during start-up, they are described in the start-up flow in detail (see section "5.3 Stepwise Start-up").

5.7.2 Hardware Protections

The only real hardware protection in this chassis appears in case of an audio problem e.g. DC voltage on the speakers. This protection will only affect the Class D audio amplifier (item 7D10; see diagram B03A) and puts the amplifier in a continuous burst mode (cyclus approximately 2 seconds).

Repair Tip
- There still will be a picture available but no sound. While the Class D amplifier tries to start-up again, the cone of the loudspeakers will move slowly in one or the other direction until the initial failure shuts the amplifier down, this cyclus starts over and over again. The headphone amplifier will also behaves similar.

5.8 Fault Finding and Repair Tips

Read also section "5.5 Error Codes, 5.5.4 Error Buffer, Extra Info".

5.8.1 Ambilight

Due to degeneration process of the LED's fitted on the ambi module, there can be a difference in the color and/or light output of the spare ambilight modules in comparison with the originals ones contained in the TV set. Via SAM => alignments => ambilight, the spare module can be adjusted.

5.8.2 Audio Amplifier

The Class D-IC 7D10 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.8.3 AV PIP

To check the AV PIP board (if present) functionality, a dedicated testpattern can be invoked as follows: select the "multiview" icon in the User Interface and press the "OK" button. Apply for the main picture an extended source, e.g. HDMI input. Proceed by entering CSM (push '123654' on the remote control) and press the yellow button. A colored testpattern should appear now, generated by the AV PIP board (this can take a few seconds).

5.8.4 CSM

When CSM is activated and there is a USB stick connected to the TV, the software will dump the complete CSM content to the USB stick. The file (Csm.txt) will be saved in the root of the USB stick. If this mechanism works it can be concluded that a large part of the operating system is already working (MIPS, USB...)

5.8.5 DC/DC Converter

Description basic board

The basic board power supply consists of 4 DC/DC converters and 5 linear stabilizers. All DC/DC converters have +12V input voltage and deliver:

- +1V1 supply voltage (1.15V nominal), for the core voltage of PNX855xx, stabilized close to the point of load; SENSE+1V1 signal provides the DC-DC converter the needed feedback to achieve this.
- +1V8 supply voltage, for the DDR2 memories and DDR2 interface of PNX855xx.
- +3V3 supply voltage (3.30V nominal), overall 3.3 V for onboard IC's, for non-5000 series SSB diversities only.
- +5V (5.15V nominal) for USB, WIFI and Conditional Access Module and +5V5-TUN for +5V-TUN tuner stabilizer.

The linear stabilizers are providing:

- +1V2 supply voltage (1.2V nominal), stabilized close to PNX855xx device, for various other internal blocks of PNX855xx; SENSE+1V2 signal provides the needed feedback to achieve this.
- +2V5 supply voltage (2.5V nominal) for LVDS interface and various other internal blocks of PNX855xx; for 5000 series SSB diversities the stabilizer is 7UD2 while for the other diversities 7UC0 is used.
- +3V3 supply voltage (3V3 nominal) for 5000 series SSB diversities, provided by 7UD3; in this case the 12V to 3V3 DC-DC converter is not present.
- +5V-TUN supply voltage (5V nominal) for tuner and IF amplifier.

+3V3-STANDY (3V3 nominal) is the permanent voltage, supplying the Stand-by microprocessor inside PNX855xx.

Supply voltage +1V1 is started immediately when +12V voltage becomes available (+12V is enabled by STANDBY signal when "low"). Supply voltages +3V3, +2V5, +1V8, +1V2 and +5V-TUN are switched "on" by signal ENABLE-3V3 when "low", provided that +12V (detected via 7U40 and 7U41) is present.

+12V is considered OK (=> DETECT2 signal becomes "high", +12V to +1V8, +12V to +3V3, +12V to +5V DC-DC converter can be started up) if it rises above 10V and doesn't drop below 9V5. A small delay of a few milliseconds is introduced between the start-up of 12V to +1V8 DC-DC converter and the two other DC-DC converters via 7U48 and associated components.

Description DVB-S2:

- LNB-RF1 (0V = disabled, 14V or 18V in normal operation) LNB supply generated via the second conversion channel of 7T03 followed by 7T50 LNB supply control IC. It provides supply voltage that feeds the outdoor satellite reception equipment.
- +3V3-DVBS (3V3 nominal), +2V5-DVBS (2V5 nominal) and +1V-DVBS (1.03V nominal) power supply for the silicon tuner and channel decoder. +1V-DVBS is generated via a 5V to 1V DC-DC converter and is stabilized at the point of load (channel decoder) by means of feedback signal SENSE+1V0-DVBS. +3V3-DVBS and +2V5-DVBS are generated via linear stabilizers from +5V-DVBS that by itself is generated via the first conversion channel of 7T03.

At start-up, +24V becomes available when STANDBY signal is "low" (together with +12V for the basic board), when +3V3 from the basic board is present the two DC-DC converters channels inside 7T03 are activated. Initially only the 24V to 5V converter (channel 1 of 7T03 generating +5V-DVBS) will effectively work, while +V-LNB is held at a level around 11V7 via diode 6T55. After 7T05 is initialized, the second channel of 7T03 will start and generates a voltage higher then LNB-RF1 with 0V8. +5V-DVBS start-up will imply +3V3-DVBS start-up, with a small delay of a few milliseconds => +2V5-DVBS and +1V-DVBS will be enabled.

If +24V drops below +15V level then the DVB-S2 supply will stop, even if +3V3 is still present.

Debugging

The best way to find a failure in the DC/DC converters is to check their start-up sequence at power "on" via the mains cord, presuming that the stand-by microprocessor and the external supply are operational. Take STANDBY signal "high"-to-"low" transition as time reference.
When +12V becomes available (maximum 1 second after STANDBY signal goes "low") then +1V1 is started immediately. After ENABLE-3V3 goes "low", all the other supply voltages should rise within a few milliseconds.

Tips

- Behavior comparison with a reference TV550 platform can be a fast way to locate failures.
- If +12V stays "low", check the integrity of fuse 1U40.
- Check the integrity (at least no short circuit between drain and source) of the power MOS-FETs before starting up the platform in SDM, otherwise many components might be damaged. Using a ohmmeter can detect short circuits between any power rail and ground or between +12V and any other power rail.
- Short circuit at the output of an integrated linear stabilizer (7UC0, 7UD2 or 7UD3) will heat up this device strongly.
- Switching frequencies should be 500 kHz ...600 kHz for 12 V to 1.1 V and 12 V to 1.8 V DC-DC converters,

900 kHz for 12 V to 3.3 V and 12 V to 5 V DC-DC converters. The DVB-S2 supply 24 V to 5 V and 24 V to +V LNB DC-DC converters operates at 300 kHz while for 5 V to 1.1 V DC-DC converter 900 kHz is used.

5.8.6 Exit "Factory Mode"

When an "F" is displayed in the screen's right corner, this means the set is in "Factory" mode, and it normally happens after a new SSB is mounted. To exit this mode, push the "VOLUME minus" button on the TV's local keyboard for 10 seconds (this disables the continuous mode).
Then push the "SOURCE" button for 10 seconds until the "F" disappears from the screen.

5.8.7 Logging

When something is wrong with the TV set (f.i. the set is rebooting) you can check for more information via the logging in Hyperterminal. The Hyperterminal is available in every Windows application via Programs, Accessories, Communications, Hyperterminal. Connect a "ComPair UART"-cable (3138 188 75051) from the service connector in the TV to the "multi function" jack at the front of ComPair II box.
Required settings in ComPair before starting to log:
- Start up the ComPair application.
- Select the correct database (open file "Q55X.X", this will set the ComPair interface in the appropriate mode).
- Close ComPair

After start-up of the Hyperterminal, fill in a name (f.i. "logging") in the "Connection Description" box, then apply the following settings:
1. COMx
2. Bits per second = 115200
3. Data bits = 8
4. Parity = none
5. Stop bits = 1
6. Flow control = none

During the start-up of the TV set, the logging will be displayed. This is also the case during rebooting of the TV set (the same logging appears time after time). Also available in the logging is the "Display Option Code" (useful when there is no picture), look for item "DisplayRawNumber" in the beginning of the logging. Tip: when there is no picture available during rebooting you are able to check for "error devices" in the logging (LAYER 2 error) which can be very helpful to determine the failure cause of the reboot. For protection state, there is no logging.

5.8.8 Guidelines Uart logging

Description possible cases:

Uart loggings are displayed:
- When Uart loggings are coming out, the first conclusion we can make is that the TV set is starting up and communication with the flash RAM seems to be supported. The PNX855xx is able to read and write in the DRAMs.
- We can not yet conclude : Flash RAM and DRAMs are fully operational/reliable.There still can be errors in the data transfers, DRAM errors, read/write speed and timing control.

No Uart logging at all:
- In case there is no Uart logging coming out, check if the startup script can be send over the I^2C bus (3 trials to startup) + power supplies are switched on and stable.
- No startup will end up in a blinking LED status : error LAYER 1 = "2", error LAYER 2 = "53" (startup with SDM solder paths short).
- Error LAYER 2 = "15" (hardware cause) is more related to a supply issue while error LAYER 2 = "53" (software cause) refers more to boot issues.

Uart loggings reporting fault conditions, error messages, error codes, fatal errors:
- Failure messages should be checked and investigated.For instance fatal error on the PNX51x0: check startup of the back-end processor, supplies..reset, I^2C bus. => error mentioned in the logging as: *51x0 failed to start by itself*.
- Some failures are indicated by error codes in the logging, check with error codes table (see Table "5-2 Error code overview").e.g. => <<<ERROR>>>PLFPOW_MERR.C : First Error (id=10,Layer_1=2,Layer_2=23).
- I^2C bus error mentioned as e.g.: " I^2C bus 4 blocked".
- Not all failures or error messages should be interpreted as fault.For instance root cause can be due to wrong option codes settings => e.g. "DVBS2Suppoprted : False/True.

In the Uart log startup script we can observe and check the enabled loaded option codes.

Defective sectors (bad blocks) in the Nand Flash can also be reported in the logging.

Startup in the SW upgrade application and observe the Uart logging:
Starting up the TV set in the Manual Software Upgrade mode will show access to USB, meant to copy software content from USB to the DRAM.Progress is shown in the logging as follows: "cosupgstdcmds_mcmdwritepart: Programming 102400 bytes, 40505344 of 40607744 bytes programmed".

Startup in Jett Mode:
Check Uart logging in Jet mode mentioned as : "JETT UART READY".

Uart logging changing preset:
=> COMMAND: calling DFB source = RC6, system=0, key = 4".

5.8.9 Loudspeakers

Make sure that the volume is set to minimum during disconnecting the speakers in the ON-state of the TV. The audio amplifier can be damaged by disconnecting the speakers during ON-state of the set!

5.8.10 PSL

In case of no picture when CSM (test pattern) is activated and backlight doesn't light up, it's recommended first to check the inverter on the PSL + wiring (LAYER 2 error = 17 is displayed in SDM).

5.8.11 Tuner

Attention: In case the tuner is replaced, always check the tuner options!

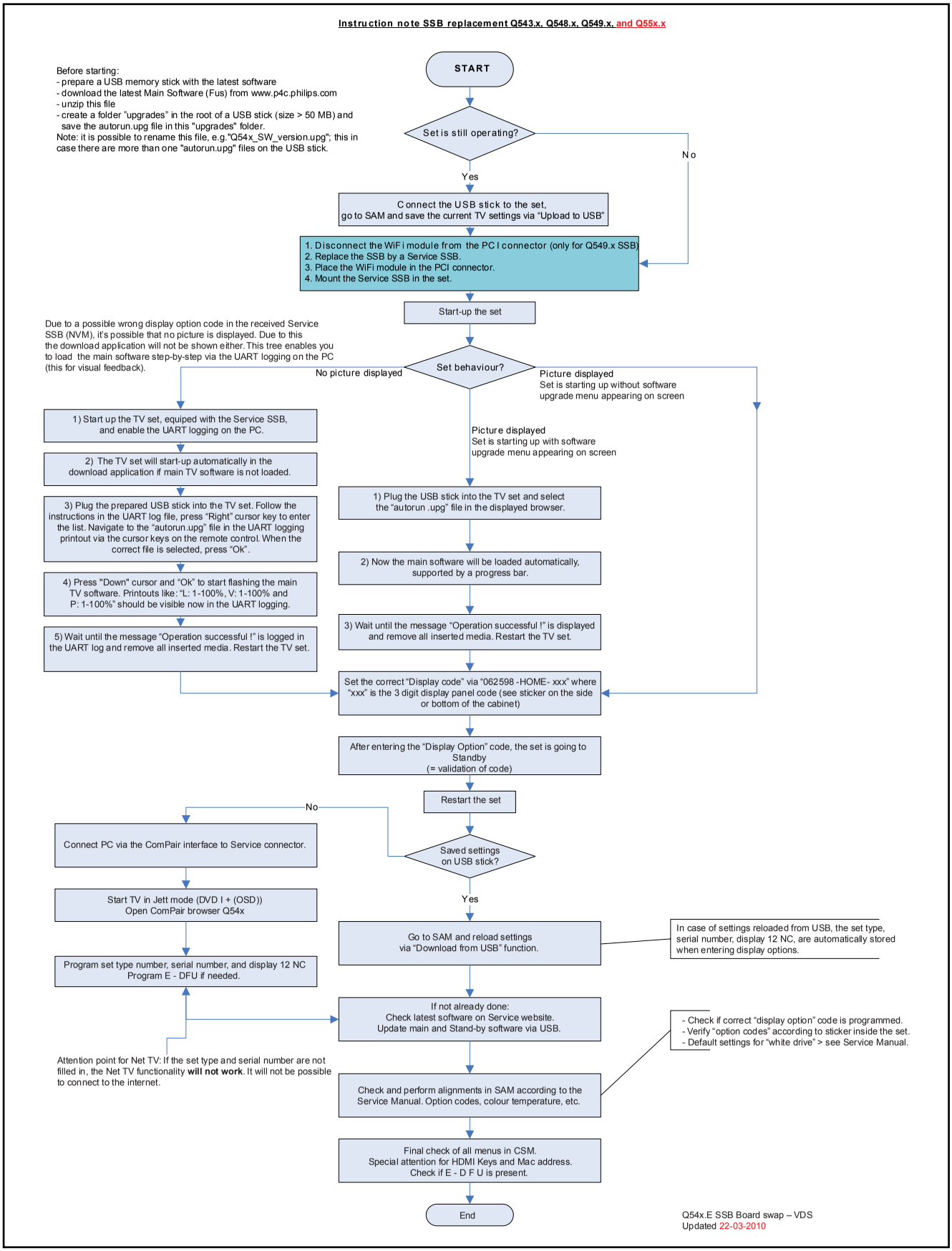
5.8.12 Display option code

Attention: In case the SSB is replaced, always check the display option code in SAM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions.

New in this chassis:
While in the download application (start up in TV mode + "OK" button pressed), the display option code can be changed via 062598 HOME XXX special SAM command (XXX=display option in 3 digits).

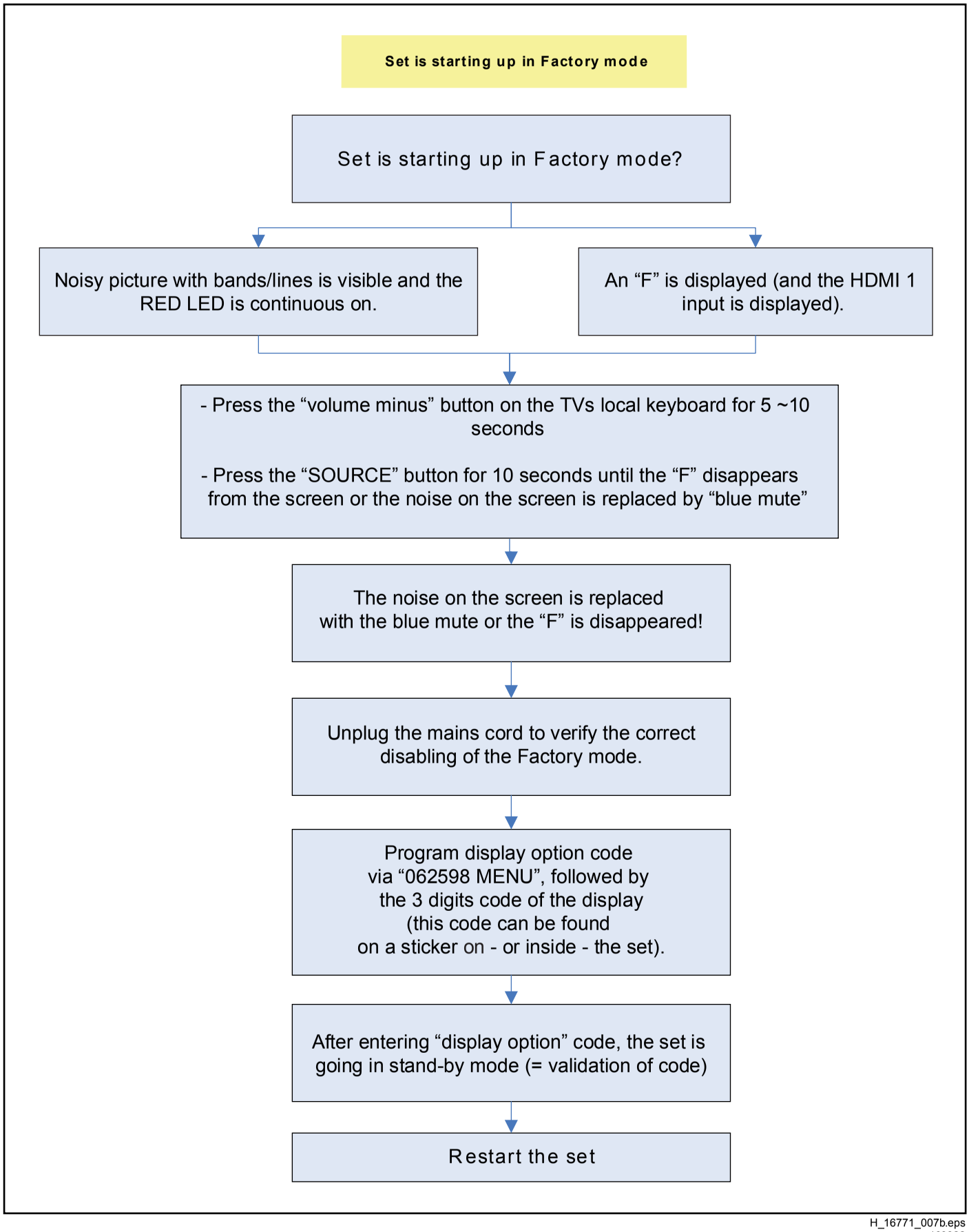
5.8.13 SSB Replacement

Follow the instructions in the flowchart in case a SSB has to be exchanged. See figure “SSB replacement flowchart”.


Instruction note SSB replacement Q543.x, Q548.x, Q549.x, and Q55x.x
Before starting:
- prepare a USB memory stick with the latest software
- download the latest Main Software (Fus) from www.p4c.philips.com
- unzip this file
- create a folder "upgrades" in the root of a USB stick (size > 50 MB) and save the autorun.upg file in this "upgrades" folder.
Note: it is possible to rename this file, e.g."Q54x_SW_version.upg"; this in case there are more than one "autorun.upg" files on the USB stick.
START
Set is still operating?
No
Yes
Connect the USB stick to the set, go to SAM and save the current TV settings via “Upload to USB”
1. Disconnect the WiFi module from the PCI connector (only for Q549.x SSB)
2. Replace the SSB by a Service SSB.
3. Place the WiFi module in the PCI connector.
4. Mount the Service SSB in the set.
Start-up the set
Due to a possible wrong display option code in the received Service SSB (NVM), it's possible that no picture is displayed. Due to this the download application will not be shown either. This tree enables you to load the main software step-by-step via the UART logging on the PC (this for visual feedback).
Set behaviour?
No picture displayed
Picture displayed
Set is starting up without software upgrade menu appearing on screen
1) Start up the TV set, equiped with the Service SSB, and enable the UART logging on the PC.
2) The TV set will start-up automatically in the download application if main TV software is not loaded.
3) Plug the prepared USB stick into the TV set. Follow the instructions in the UART log file, press “Right” cursor key to enter the list. Navigate to the “autorun.upg” file in the UART logging printout via the cursor keys on the remote control. When the correct file is selected, press “Ok”.
4) Press "Down" cursor and “Ok” to start flashing the main TV software. Printouts like: “L: 1-100%, V: 1-100% and P: 1-100%” should be visible now in the UART logging.
5) Wait until the message “Operation successful !” is logged in the UART log and remove all inserted media. Restart the TV set.
Picture displayed
Set is starting up with software upgrade menu appearing on screen
1) Plug the USB stick into the TV set and select the “autorun .upg” file in the displayed browser.
2) Now the main software will be loaded automatically, supported by a progress bar.
3) Wait until the message “Operation successful !” is displayed and remove all inserted media. Restart the TV set.
Set the correct “Display code” via “062598 -HOME- xxx” where “xxx” is the 3 digit display panel code (see sticker on the side or bottom of the cabinet)
After entering the “Display Option” code, the set is going to Standby (= validation of code)
Restart the set
No
Saved settings on USB stick?
Yes
Connect PC via the ComPair interface to Service connector.
Start TV in Jett mode (DVD I + (OSD)) Open ComPair browser Q54x
Program set type number, serial number, and display 12 NC Program E - DFU if needed.
Attention point for Net TV: If the set type and serial number are not filled in, the Net TV functionality will not work. It will not be possible to connect to the internet.
Go to SAM and reload settings via “Download from USB” function.
In case of settings reloaded from USB, the set type, serial number, display 12 NC, are automatically stored when entering display options.
If not already done: Check latest software on Service website. Update main and Stand-by software via USB.
- Check if correct “display option” code is programmed.
- Verify “option codes” according to sticker inside the set.
- Default settings for “white drive” > see Service Manual.
Check and perform alignments in SAM according to the Service Manual. Option codes, colour temperature, etc.
Final check of all menus in CSM. Special attention for HDMI Keys and Mac address. Check if E - D F U is present.
End
Q54x.E SSB Board swap – VDS
Updated 22-03-2010

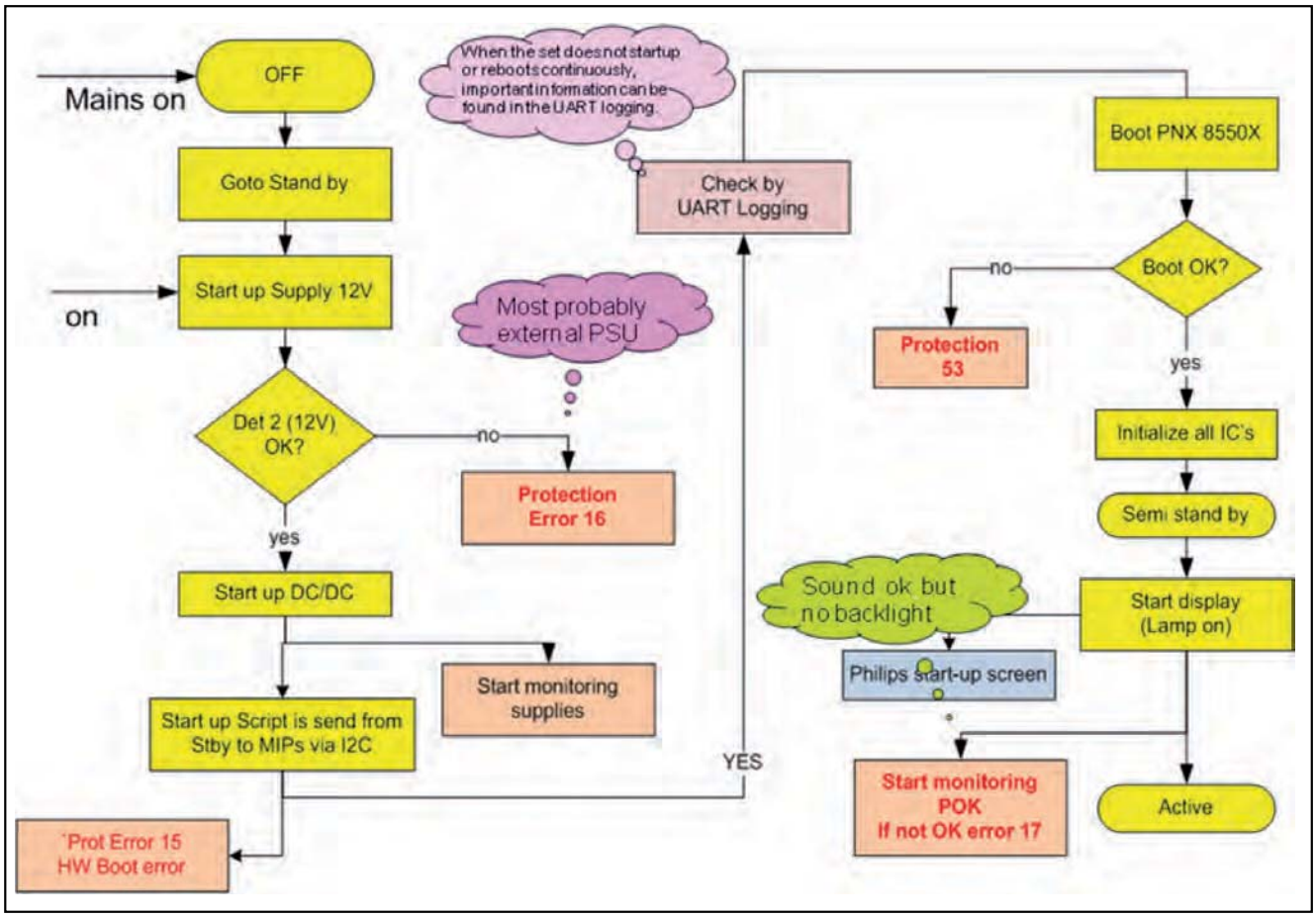
H_16771_007a.eps
100402

Figure 5-11 SSB replacement flowchart


Set is starting up in Factory mode
Set is starting up in Factory mode?
Noisy picture with bands/lines is visible and the RED LED is continuous on.
An “F” is displayed (and the HDMI 1 input is displayed).
- Press the “volume minus” button on the TVs local keyboard for 5 ~10 seconds
- Press the “SOURCE” button for 10 seconds until the “F” disappears from the screen or the noise on the screen is replaced by “blue mute”
The noise on the screen is replaced with the blue mute or the “F” is disappeared!
Unplug the mains cord to verify the correct disabling of the Factory mode.
Program display option code via “062598 MENU”, followed by the 3 digits code of the display (this code can be found on a sticker on - or inside - the set).
After entering “display option” code, the set is going in stand-by mode (= validation of code)
Restart the set

H_16771_007b.eps
100322

Figure 5-12 SSB replacement flowchart - Factory mode



18753_211_100811.eps
100811

Figure 5-13 SSB start-up

5.9 Software Upgrading

Attention!
Software version numbers for 2011 sets are all defined below number 0.40.x.x. This might confuse servicers who store software versions for more than one set and/or platform on the same storage device (USB stick).

Always check the latest software version on the servicer website in relation to the correct CTN!!!

5.9.1 Introduction

The set software and security keys are stored in a NAND-Flash, which is connected to the PNX855xx.

It is possible **for the user** to upgrade the **main** software via the USB port. This allows replacement of a software image in a stand alone set, without the need of an E-JTAG debugger. A description on how to upgrade the main software can be found in the electronic User Manual.

Important: When the NAND-Flash must be replaced, a new SSB must be ordered, due to the presence of the security keys! (CI +, MAC address, ...).
Perform the following actions after SSB replacement:
1. Set the correct option codes (see sticker inside the TV).
2. Update the TV software => see the eUM (electronic User Manual) for instructions.
3. Perform the alignments as described in chapter 6 (section 6.5 Reset of Repaired SSB).
4. Check in CSM if the CI + key, MAC address.. are valid.

For the correct order number of a new SSB, always refer to the Spare Parts list!

5.9.2 Main Software Upgrade

- The “UpgradeAll.upg” file is only used in the factory.

Automatic Software Upgrade
In “normal” conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the “AUTORUN.UPG” (FUS part of the one-zip file: e.g. 3104 337 05661 _FUS _Q555X_ x.x.x.x_prod.zip). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see eUM). The “autorun.upg” file must be placed in the root of the USB stick.
How to upgrade:
1. Copy “AUTORUN.UPG” to the root of the USB stick.
2. Insert USB stick in the set while the set is operational. The set will restart and the upgrading will start automatically. As soon as the programming is finished, a message is shown to remove the USB stick and restart the set.

Manual Software Upgrade
In case that the software upgrade application does not start automatically, it can also be started manually.
How to start the software upgrade application manually:
1. Disconnect the TV from the Mains/AC Power.
2. Press the “OK” button on a Philips TV remote control or a Philips DVD RC-6 remote control (it is also possible to use

a TV remote in “DVD” mode). Keep the “OK” button pressed while reconnecting the TV to the Mains/AC Power.
3. The software upgrade application will start.

Attention!
In case the download application has been started **manually**, the “autorun.upg” will maybe not be recognized.
What to do in this case:
1. Create a directory “UPGRADES” on the USB stick.
2. Rename the “autorun.upg” to something else, e.g. to “software.upg”. Do not use long or complicated names, keep it simple. Make sure that “AUTORUN.UPG” is no longer present in the root of the USB stick.
3. Copy the renamed “upg” file into this directory.
4. Insert USB stick into the TV.
5. The renamed “upg” file will be visible and selectable in the upgrade application.

Back-up Software Upgrade Application
If the default software upgrade application does not start (could be due to a corrupted boot sector) via the above described method, try activating the “back-up software upgrade application”.
How to start the “back-up software upgrade application” manually:
1. Disconnect the TV from the Mains/AC Power.
2. Press the “CURSOR DOWN”-button on a Philips TV remote control while reconnecting the TV to the Mains/AC Power.
3. The back-up software upgrade application will start.

5.9.3 Stand-by Software Upgrade via USB

In this chassis it is possible to upgrade the Stand-by software via a USB stick. The method is similar to upgrading the main software via USB.
Use the following steps:
1. Create a directory “UPGRADES” on the USB stick.
2. Copy the Stand-by software (part of the one-zip file, e.g. StandbyFactory_88.0.0.0.upg) into this directory.
3. Insert the USB stick into the TV.
4. Start the download application manually (see section “Manual Software Upgrade”.
5. Select the appropriate file and press the “OK” button to upgrade.

5.9.4 Content and Usage of the One-Zip Software File

Below the content of the One-Zip file is explained, and instructions on how and when to use it.
- **AmbiCpld_Q55XX_x.x.x.x_prod.zip.** Contains the program instruction and software content, needed to upgrade the ambilight CPLD on the TV550 platform.
- **BalanceFPGA_Q555X_x.x.x.x_prod.zip.** Contains the BalanceFPGA software in “upg” format.
- **FUS_Q555X_x.x.x.x_prod.zip.** Contains the “autorun.upg” which is needed to upgrade the TV main software and the software download application.
- **PNX5130UPG_Q555X_x.x.x.x_prod.zip.** Contains the PNX5130 software in “upg” format.
- **StandbySW_Q555X_x.x.x.x_prod.zip.** Contains the StandbyFactory software in “upg” format.
- **ProcessNVM_Q55XX_x.x.x.x_prod.zip.** Default NVM content. Must be programmed via ComPair or can be loaded via USB, be aware that all alignments stored in NVM are overwritten here.

5.9.5 UART logging 2K10 (see section “5.8 Fault Finding and Repair Tips, 5.8.7 Logging)

6. Alignments

Index of this chapter:

6.1 General Alignment Conditions
6.2 Hardware Alignments
6.3 Software Alignments
6.4 Option Settings
6.5 Reset of Repaired SSB
6.6 Total Overview SAM modes

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
  - **AP-NTSC:** 120 VAC or 230 V_{AC} / 50 Hz (± 10%).
  - **AP-PAL-multi:** 120 - 230 V_{AC} / 50 Hz (± 10%).
  - **EU:** 230 V_{AC} / 50 Hz (± 10%).
  - **LATAM-NTSC:** 120 - 230 V_{AC} / 50 Hz (± 10%).
  - **US:** 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
  Caution: It is not allowed to use heat sinks as ground.
- Test probe: Ri > 10 MΩ, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

6.1.1 Alignment Sequence

- First, set the correct options:
  - In SAM, select “Option numbers”.
  - Fill in the option settings for “Group 1” and “Group 2” according to the set sticker (see also paragraph 6.4 Option Settings).
  - Press OK on the remote control before the cursor is moved to the left.
  - In submenu “Option numbers” select “Store” and press OK on the RC.
- OR:
  - In main menu, select “Store” again and press OK on the RC.
  - Switch the set to Stand-by.
- Warming up (>15 minutes).

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

Put the set in SAM mode (see Chapter 5. Service Modes, Error Codes, and Fault Finding). The SAM menu will now appear on the screen. Select ALIGNMENTS and go to one of the sub menus. The alignments are explained below.
The following items can be aligned:

- White point
- Ambilight.

To store the data:

- Press OK on the RC **before the cursor is moved to the left**
- In main menu select “Store” and press OK on the RC
- Switch the set to stand-by mode.

For the next alignments, supply the following test signals via a video generator to the RF input:

- **EU/AP-PAL models:** a PAL B/G TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz
- **US/AP-NTSC models:** an NTSC M/N TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).
- **LATAM models:** an NTSC M TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).

6.3.1 White Point

- Choose “TV menu”, “Setup”, “More TV Settings” and then “Picture” and set picture settings as follows:

Picture Setting	
Contrast	100
Brightness	50
Colour	0
Light Sensor	Off
Picture format	Unscaled

- In menu “Picture”, choose “Pixel Plus HD” and set picture settings as follows:

Picture Setting	
Dynamic Contrast	Off
Dynamic Backlight	Off
Colour Enhancement	Off
Gamma	0

- Go to the SAM and select “Alignments”-> “White point”.

White point alignment LCD screens:

- Use a 100% white screen (format: 720p50) to the HDMI input and set the following values:
  - “Color temperature”: “Cool”.
  - All “White point” values to: “127”.

In case you have a color analyzer:

- Measure, in a dark environment, with a calibrated contactless color analyzer (Minolta CA-210 or Minolta CS-200) in the centre of the screen and note the x, y value.
- Change the pattern to 90% white screen. If a Quantum Data generator is used, select the “GreyAll” test pattern at level = 230.
- Adjust the correct x, y coordinates (while holding one of the White point registers R, G or B on 127) by means of decreasing the value of one or two other white points to the correct x, y coordinates (see Table 6-1 White D alignment values - LED - Minolta CA-210, or 6-2 White D alignment values - LED - Minolta CS-200). Tolerance: dx: ± 0.002, dy: ± 0.002.
- Repeat this step for the other color temperatures that need to be aligned.
- When finished press OK on the RC and then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-1 White D alignment values - LED - Minolta CA-210

Value	Cool (9420K)	Normal (8120K)	Warm (6080K)
x	0.282	0.292	0.320
y	0.298	0.311	0.345

Table 6-2 White D alignment values - LED - Minolta CS-200

Value	Cool (11000K)	Normal (9000K)	Warm (6500K)
x	0.276	0.287	0.313
y	0.282	0.296	0.329

If you do not have a color analyzer, you can use the default values. This is the next best solution. The default values are average values coming from production.

- Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in Table 6-3.
- When finished press OK on the RC, then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-3 White tone default setting 40" (Blockbuster)

White Tone	e.g. 40PFL6606x		
Colour Temp	R	G	B
Normal	t.b.d.	t.b.d.	t.b.d.
Cool	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

6.4 Option Settings

6.4.1 Introduction

The microprocessor communicates with a large number of I^2C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these PNX51XX ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) plus integrated Ambilight control) is made known by the option codes.

Notes:

- After changing the option(s), save them by pressing the OK button on the RC before the cursor is moved to the left, select STORE in the SAM root menu and press OK on the RC.
- The new option setting is only active after the TV is switched “off” / “stand-by” and “on” again with the mains switch (the NVM is then read again).

6.4.2 Dealer Options

For dealer options, in SAM select “Dealer options”.
See Table 6-5 SAM mode overview.

6.4.3 (Service) Options

From 2011 onwards, it is not longer possible to change individual option settings in SAM. Options can only be changed all at once by using the option codes as described in section 6.4.4.

6.4.4 Opt. No. (Option numbers)

Select this sub menu to set all options at once (expressed in two long strings of numbers).
An option number (or “option byte”) represents a number of different options. When you change these numbers directly, you can set all options very quickly. All options are controlled via eight option numbers.
When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set both option number lines. You can find the correct option numbers on a sticker inside the TV set.
Example: The options sticker gives the following option numbers:

- 08192 00133 01387 45160
- 12232 04256 00164 00000

The first line (group 1) indicates hardware options 1 to 4, the second line (group 2) indicate software options 5 to 8.
Every 5-digit number represents 16 bits (so the maximum value will be 65536 if all options are set).
When all the correct options are set, the sum of the decimal values of each Option Byte (OB) will give the option number.

Diversity
Not all sets with the same Commercial Type Number (CTN) necessarily have the same option code!
Use of Alternative BOM => an alternative BOM number usually indicates the use of an alternative display or power supply. This results in another display code thus in another Option code.
Refer to Chapter 2, Technical Specifications, Diversity, and Connections.

6.4.5 Option Code Overview

Refer to the sticker in the set for the correct option codes.
Important: after having edited the option numbers as described above, you **must press OK** on the remote control **before the cursor is moved to the left**!

6.4.6 Option Bit Overview

For test purposes, please find below an overview of the Option Codes on **bit** level. With a bin/dec converter, you can calculate the Option Code.

Caution
When manipulating option codes, know what you’re doing. Wrong option codes could damage the set.
Prescribed option codes below are an *example*, *not valid for all sets* and are *subject to modification*.
The correct option codes are always present on a sticker inside the set!

Table 6-4 Option codes at bit level (Option 1 - Option 8)

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Option 1 (prescribed value 32776[1)])				
Bit 15 (MSB)	32768	Video Store Streaming	1[1)]	0 = OFF 1 = ON
Bit 14	16384	Multi App	00[1)]	00 = none 01 = multi app (Multiview BASIC) 10 = AVPIP + multi app (Multiview ENHANCED) 11 = future use
Bit 13	8192			
Bit 12	4096	Perfect Pixel	00[1)]	00 = Pixel Plus HD 01 = Pixel Precise HD 10 = Perfect Pixel HD 11 = future use
Bit 11	2048			
Bit 10	1024	Tuner Type	000[1)]	000 = TH2603 (Europe/AP) 001 = FA2307 (Brazil) 010 = VA1E1ED2411 011 = future use 100 = future use 101 = future use 110 = future use 111 = future use
Bit 9	512			
Bit 8	256			

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Bit 7	128	PQ Profiles	000[1)]	000 = profile 0 001 = profile 1 010 = profile 2 011 = profile 3 100 = profile 4 101 = profile 5 110 = profile 6 111 = profile 7
Bit 6	64			
Bit 5	32			
Bit 4	16	DNM	01[1)]	00 = Perfect Natural Motion 01 = HD Natural Motion 10 = future use 11 = future use
Bit 3	8			
Bit 2	4	MOP AL	0[1)]	CPLD, not used in 2011
Bit 1	2	AL Optical Syst	00[1)]	00 = 140 nit 01 = 200 nit 10 = future use 11 = future use
Bit 0 (LSB)	1			
Option 2 (prescribed value 00001[1)])				
Bit 15 (MSB)	32768	AL Shop Mode	0[1)]	0 = boost mode in shop is OFF 1 = boost mode in shop is ON
Bit 14	16384	AL settings storage location	0[1)]	0 = stored in AL modules 1 = stored in SSB
Bit 13	8192	Wall Adaptive AL	0[1)]	0 = OFF 1 = ON
Bit 12	4096	Sunset	0[1)]	0 = OFF 1 = ON
Bit 11	2048	Ambient Light	0000[1)]	0000 = none 0001 = 2-sided (3/3) 0010 = 2-sided (4/4) 0011 = 2-sided (5/5) 0100 = 2-sided (6/6) 0101 = 2-sided (7/7) 0110 = 3-sided (5/5/5) 0111 = 3-sided (6/6/6) 1000 = 3-sided (3/6/3) 1001 = 3-sided (6/9/6) 1010 = 2-sided (8/8) 1011 = 3-sided (4/4/4) 1100 = 2-sided (1/1) 1101 = 2-sided (2/2) 1110 = future use 1111 = future use
Bit 10	1024			
Bit 9	512			
Bit 8	256			
Bit 7	128	FPGA3Dact/1Ddimm	0[1)]	0 = OFF 1 = ON
Bit 6	64	AL Select	0[1)]	0 = AL2k10 1 = AL2k11
Bit 5	32	3D Passive	0[1)]	0 = 2D 1 = 3D passive
Bit 4	16	Smart Bit Enhancement (SBE)	0[1)]	0 = off 1 = on (200 Hz board present)
Bit 3	8	Super Resolution	0[1)]	0 = Super Resolution SD 1 = Super Resolution HD
Bit 2	4	Light Sensor LUT	00[1)]	00 = Lut 0 01 = Lut 1 10 = Lut 2 11 = Lut 3
Bit 1	2			
Bit 0 (LSB)	1	Light Sensor	1[1)]	0 = OFF 1 = ON
Option 3 (prescribed value 15421[1)])				
Bit 15 (MSB)	32768	Side IO	0[1)]	0 = not present 1 = present
Bit 14	16384	AV3	011[1)]	000 = none 001 = CVBS 010 = YPbPr 011 = YPbPr/LR 100 = YPbPr/HV/LR 101 = CVBS/LR 110 = CVBS/Yc/LR 111 = future use
Bit 13	8192			
Bit 12	4096			
Bit 11	2048	AV2	11[1)]	00 = Scart/CVBS/RGB/LR 01 = CVBS/LR 10 = YPbPr/LR 11 = none
Bit 10	1024			
Bit 9	512	AV1	00[1)]	00 = Scart/CVBS/RGB/LR 01 = CVBS/YC/YPbPr/HV/LR 10 = CVBS/YC/YPbPr/LR 11 = YPbPr/LR
Bit 8	256			
Bit 7	128	3D Prepared	0[1)]	0 = not prepared 1 = prepared
Bit 6	64	Sound in Stand	0[1)]	0 = Sound in Cabinet 1 = Sound in Stand
Bit 5	32	Headphone	1[1)]	0 = OFF 1 = ON
Bit 4	16	Seamless System	1[1)]	0 = OFF 1 = ON
Bit 3	8	ViewPort 21_9/PQL	1[1)]	0 = OFF 1 = ON
Bit 2	4	HDMI Side	1[1)]	0 = OFF 1 = ON
Bit 1	2	HDMI 3	0[1)]	0 = OFF 1 = ON
Bit 0 (LSB)	1	HDMI 2	1[1)]	0 = OFF 1 = ON

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Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Option 4 (prescribed value 02235[1)])				
Bit 15 (MSB)	32768	Cabinet	00001[1)]	Cabinet type (no detailed info available)
Bit 14	16384			
Bit 13	8192			
Bit 12	4096			
Bit 11	2048			
Bit 10	1024	Region	000[1)]	000 = Europe (/02, /05 & /12) 001 = AP PAL multi 010 = AP NTSC 011 = Russian (/60) 100 = Latam (/78 & /77) 101 = Australia 110 = China (/93) 111 = future use
Bit 9	512			
Bit 8	256			
Bit 7	128	Display MSB	1[1)]	0 = display option =< 255 1 = display option > 255
Bit 6	64	S Video	0[1)]	0 = OFF 1 = ON
Bit 5	32	Video Store SD Card	1[1)]	0 = OFF 1 = ON
Bit 4	16	Internet SW Upgrade	1[1)]	0 = OFF 1 = ON (automatic software upgradable via internet)
Bit 3	8	Online Service	1[1)]	0 = OFF 1 = ON (connection to internet provider Philips)
Bit 2	4	WiFi	0[1)]	0 = OFF 1 = ON (wireless connection to ethernet; no link with “Ethernet option” bit “0”)
Bit 1	2	DLNA	1[1)]	0 = OFF 1 = PC link
Bit 0 (LSB)	1	Ethernet	1[1)]	0 = OFF 1 = Ethernet vonnector and HW present
Option 5 (prescribed value 43847[1)])				
Bit 15 (MSB)	32768	8 Days EPG	1[1)]	0 = OFF 1 = ON (country dependent)
Bit 14	16384	DVBC Installation	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 13	8192			
Bit 12	4096	DVBT Installation	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 11	2048			
Bit 10	1024	DVB-S	0[1)]	0 = OFF 1 = ON (ATSC/DVB should be ON)
Bit 9	512	DVB-C	1[1)]	0 = OFF 1 = ON (ATSC/DVB should be ON)
Bit 8	256	DVB	1[1)]	0 = analogue only 1 = DVBT (and C/S depending DVBC/S option)
Bit 7	128	Display Type	01000111[1)]	Display Type (ex.: 327)
Bit 6	64			
Bit 5	32			
Bit 4	16			
Bit 3	8			
Bit 2	4			
Bit 1	2			
Bit 0 (LSB)	1			
Option 6 (prescribed value 36615[1)])				
Bit 15 (MSB)	32768	E-sticker	1[1)]	0 = OFF 1 = ON
Bit 14	16384	Hotel Mode	00[1)]	00 = OFF 01 = 1V1 10 = 1V2 11 = future use
Bit 13	8192			
Bit 12	4096	Virgin	0[1)]	0 = ON 1 = OFF
Bit 11	2048	USB Time Shift	1[1)]	0 = OFF 1 = ON
Bit 10	1024	Auto Store Mode	11[1)]	00 = none 01 = PDC_VPS 10 = TXT page 11 = PDC_VPS_TXT
Bit 9	512			
Bit 8	256	PVR	1[1)]	0 = OFF 1 = ON
Bit 7	128	Ginga	00[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 6	64			
Bit 5	32	MHP	00[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 4	16			
Bit 3	8	Over the Air Download	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 2	4			
Bit 1	2	DVBC light	1[1)]	0 = OFF 1 = ON (when DVBC Installation is OFF or when ON but selected country is OFF, this option is used)

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Bit 0 (LSB)	1	DVBT light	1[1)]	0 = OFF 1 = ON (when DVBT Installation is OFF or Country depend to a country is OFF, this option is used)
Option 7 (prescribed value 33024[1)])				
Bit 15 (MSB)	32768	Visual Identity	1[1)]	0 = User Interface 2k10 1 = User Interface 2k11
Bit 14	16384	Red LED Config LUT	000[1)]	000 = LED config LUT 0 001 = LED config LUT 1 010 = LED config LUT 2 011 = LED config LUT 3 100 = LED config LUT 4 101 = LED config LUT 5 110 = LED config LUT 6 111 = LED config LUT 7
Bit 13	8192			
Bit 12	4096			
Bit 11	2048	Board Identifier	00[1)]	not used, should always be “00”
Bit 10	1024			
Bit 9	512	Manet	0[1)]	0 = all sets except Manet 1= Manet
Bit 8	256	Auto Power Down	1[1)]	0 = OFF 1 = ON
Bit 7	128	Light Guide	0[1)]	0 = OFF 1 = ON
Bit 6	64	E-box	0[1)]	0 = integrated set 1 = e-box/monitor
Bit 5	32	Temp LUT	000[1)]	000 = temp lut 0 001 = temp lut 1 010 = temp lut 2 011 = temp lut 3 100 = future use 101 = future use 110 = future use 111 = future use
Bit 4	16			
Bit 3	8			
Bit 2	4	Temp Sensor	00[1)]	00 = no temp sensor 01 = temp sensor in display 10 = temp sensor on additional board 11 = temp sensor in AL module
Bit 1	2			
Bit 0 (LSB)	1	FAN	0[1)]	0 = no fan 1 = fan(s) present)
Option 8 (prescribed value 00012[1)])				
Bit 15 (MSB)	32768	Test 8	0[1)]	-
Bit 14	16384	Test 7	0[1)]	-
Bit 13	8192	Test 6	0[1)]	-
Bit 12	4096	Test 5	0[1)]	-
Bit 11	2048	Test 4 (Trick Mode)	0[1)]	0 = OFF 1 = ON
Bit 10	1024	Test 3 (XRay)	0[1)]	0 = OFF 1 = ON
Bit 9	512	Test 2 (DBV-T light)	0[1)]	0 = OFF 1 = ON
Bit 8	256	Test 1 (Monitor out)	0[1)]	0 = OFF 1 = ON
Bit 7	128	not used	0000[1)]	-
Bit 6	64			
Bit 5	32			
Bit 4	16			
Bit 3	8	WM DRM10	1[1)]	0 = OFF 1 = ON
Bit 2	4	HBBTV	1[1)]	0 = OFF 1 = ON
Bit 1	2	DVB-T2 Installation	0[1)]	0 = OFF 1 = ON
Bit 0 (LSB)	1	DVB-T2	0[1)]	0 = OFF 1 = ON

Note
1). Example

6.5 Reset of Repaired SSB

A very important issue towards a repaired SSB from a Service repair shop (SSB repair on component level) implies the reset of the NVM on the SSB.
A repaired SSB in Service should get the service Set type “00PF0000000000” and Production code “00000000000000”. Also the virgin bit is to be set. To set all this, you can use the ComPair tool or use the “NVM editor” and “Dealer options” items in SAM (do not forget to “store”).

After a repaired SSB has been mounted in the set (set repair on board level), the type number (CTN) and production code of the TV has to be set according to the type plate of the set. For this, you can use the NVM editor in SAM. This action also ensures the correct functioning of the “Net TV” feature and access to the Net TV portals. The loading of the CTN and production code can also be done via ComPair (Model number programming).

After a SSB repair, the original channel map can be restored, provided that the original channel map was stored on a USB stick before repair was commenced and that basic functionality of the TV, needed for this procedure, was not hampered as a result of the defect. The procedure of “channel map cloning” is clearly described in the (electronic) user manual.

In case of a display replacement, reset the “Operation hours display” to “0”, or to the operation hours of the replacement display.

6.5.1 SSB identification

Whenever ordering a new SSB, it should be noted that the correct ordering number (12nc) of a SSB is located on a sticker on the SSB. The format is <12nc SSB><serial number>. The ordering number of a “Service” SSB is the same as the ordering number of an initial “factory” SSB.

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Figure 6-1 SSB identification

6.6 Total Overview SAM modes

Table 6-5 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Hardware Info	A. SW version	e.g. “Q5551_0.9.1.0		Display TV & Stand-by SW version and CTN serial number
	B. Stand-by processor version	e.g. “STDBY_83.84.0.0”		
	C. Production code	e.g. “see type plate”		
Operation hours				Displays the accumulated total of operation hours.TV switched “on/off” & every 0.5 hours is increase one
Errors				Displayed the most recent errors
Reset error buffer				Clears all content in the error buffer
Alignment	White point	Colour temperature	Normal	3 different modes of colour temperature can be selected
			Warn	
			Cool	
		White point red		LCD White Point Alignment. For values, see Table 6-3 White tone default setting 40" (Blockbuster)
		White point green		
		White point blue		
	Ambilight	Select module		
		Brightness		
		Select matrix		
Dealer options	Virgin mode	Off/On		Select Virgin mode On/Off. TV starts up / does not start up (once) with a language selection menu after the mains switch is turned “on” for the first time (virgin mode)
	E-sticker	Off/On		Select E-sticker On/Off (USP’s on-screen)
	Auto store mode	None		
		PDC/VPS		
		TXT page		
		PDC/VPS/TXT		
Option numbers	Group 1	e.g. “00008.00001.15421.02239”		The first line (group 1) indicates hardware options 1 to 4
	Group 2	e.g. “44816.34311.33024.00000”		The second line (group 2) indicates software options 5 to 8
	Store			Store after changing
Initialise NVM				N.A.
Store				Select Store in the SAM root menu after making **any** changes
Operation hours display		0003		In case the display must be swapped for repair, you can reset the “”Display operation hours” to “0”. So, this one does keeps up the lifetime of the display itself (mainly to compensate the degeneration behaviour)
Software maintenance	Software events	Display		Display information is for development purposes
		Clear		
		Test reboot		
		Test cold reboot		
		Test application crash		
	Hardware events	Display		Display information is for development purposes
		Clear		

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Test setting	Digital info	Current frequency: 538		
		QAM modulation: 64-qam		Display information is for development purposes
		Symbol rate:		
		Original network ID: 12871		
		Network ID: 12871		
		Transport stream ID: 2		
		Service ID: 3		
		Hierarchical modulation: 0		
		Selected video PID: 35		
		Selected main audio PID: 99		
		Selected 2nd audio PID: 8191		
	Install start frequency	000		Install start frequency from “0” MHz
	Install end frequency	999		Install end frequency as “999” MHz
	Default install frequency			
	Installation	Digital only		Select Digital only or Digital + Analogue before installation
		Digital + Analogue		
Development file versions	Development 1 file version	Display parameters DISPT5.0.9.29		Display information is for development purposes
		Acoustics parameters ACSTS 5.0.6.20		
		PQ - TV550 1.0.27.22		
		PQS- Profile set		
		PQF - Fixed settings		
		PQU - User styles		
		Ambilight parameters PRFAM 5.0.5.2		
	Development 2 file version	12NC one zip software		Display information is for development purposes
		Initial main software		
		NVM version Q55x1_0.4.5.0		
		Flash units software		
		Temp com file version none		
Upload to USB	Channel list			To upload several settings from the TV to an USB stick
	Personal settings			
	Option codes			
	Alignments			
	Identification data			
	History list			
	All (options included)			
Download from USB	Channel list			To download several settings from the USB stick to the TV
	Personal settings			
	Option codes			
	Alignments			
	Identification data			
	All (options included)			
NVM editor	Type number	see type plate		NVM editor; re key-in type number and production code after SSB replacement
	AG code	see type plate		

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7. Circuit Descriptions

Index of this chapter:

7.1 Introduction
7.2 Power Supply
7.3 DC/DC Converters
7.4 Front-End Analogue and DVB-T, DVB-C; ISDB-T reception
7.5 Front-End DVB-S(2) reception
7.6 HDMI
7.7 Video and Audio Processing - PNX855xx

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the wiring-, block- (see chapter 9. Block Diagrams) and circuit diagrams (see chapter 10. Circuit Diagrams and PWB Layouts).Where necessary, you will find a separate drawing for clarification.

7.1 Introduction

The Q552.2L LA is part of the TV550 platform and uses the (same) PNX855xx chipset.
The major deltas versus its predecessor Q551 are:

- support of DVB-T2 (“second generation” DVBT)
- implementation of “passive” 3D
- removal of TCON from the SSB (comes with the display)
- changed power architecture
- new USB hub (where applicable).

The Q552.2L LA chassis comes with the following stylings:

- Berlinale (series xxPFL58xx),
- Blockbuster (series xxPFL66xx),
- Emmy (series xxPFL76xx),
- Sundance (series xxPFL86xx).

7.1.1 Implementation

Key components of this chassis are:

- PNX855xx System-On-Chip (SOC) TV Processor
- TX26xx Hybrid Tuner (DVB-T/C, analogue)
- STV6110AT DVB-S Satellite Tuner
- SII9x87 HDMI Switch
- TPA312xD2PWP Class D Power Amplifier
- LAN8710 Dual Port Gigabit Ethernet media access controller.

7.1.2 TV550 Architecture Overview

For details about the chassis block diagrams refer to chapter 9. Block Diagrams. An overview of the TV550 2011 architecture can be found in Figure 7-1.

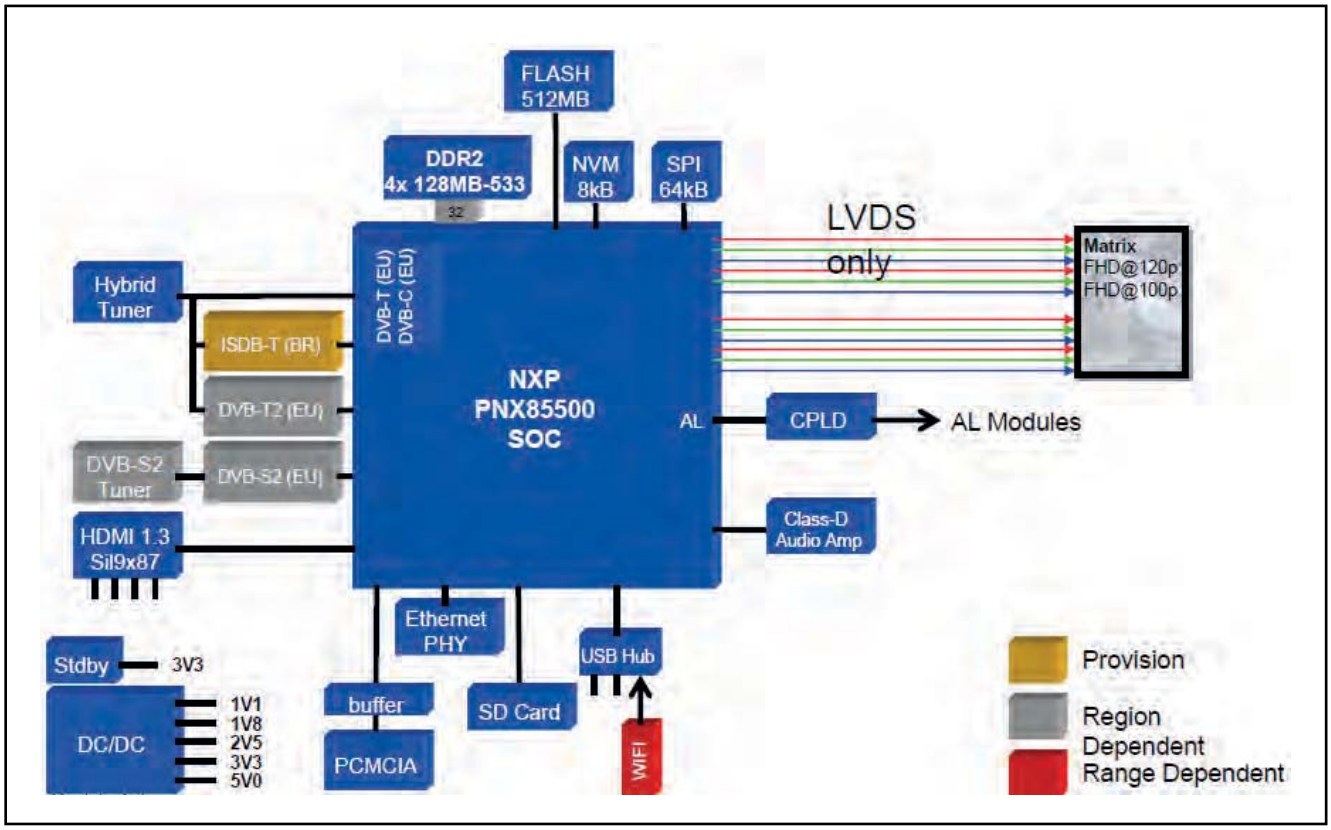

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Figure 7-1 Architecture of TV550 platform 2011

7.1.3 SSB Cell Layout

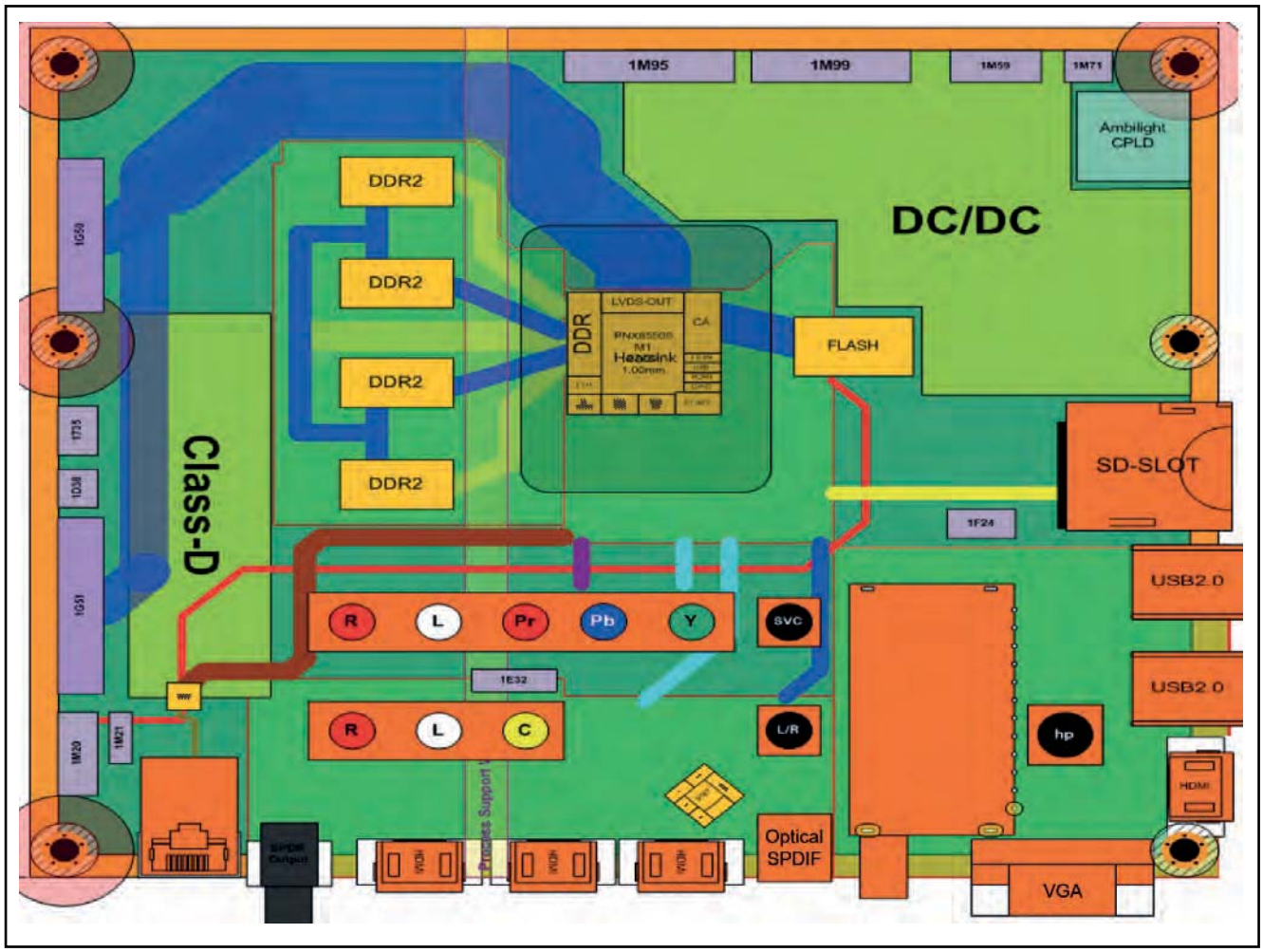

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Figure 7-2 SSB layout cells (top view)

7.2 Power Supply

7.2.1 Power Supply Unit

All power supplies are a black box for Service. When defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market. Consult the Philips Service web portal for the order codes of the boards.

In this manual, no detailed information is available because of design protection issues.

7.2.2 Connector overview Blockbuster (series xxPFL6600/xx)

Table 7-1 Connector overview 32" sets

	Connector		
no.	**1308**	**1316**	**1M95**
Descr.	**Mains**	**to display**	**to SSB**
Pin	**CN1**	**CN2**	**CN4**
1	N	A2	+3V3SB
2	L	n.c.	Standby
3	-	pin 5	GND1
4	-	n.c.	GND1
5	-	pin 3	+12V3
6	-	n.c.	+12V3
7	-	OCD	+Vsnd
8	-	n.c.	GND1
9	-	A1	BL-ON-OFF
10	-	n.c.	BL-DIM1
11	-	pin 13	BL-I-CTRL
12	-	n.c.	POK
13	-	pin 11	+24V
14	-	n.c.	GND1
15	-	GND1	-

Table 7-2 Connector overview 37" sets

	Connector		
no.	**1308**	**1316**	**1M95**
Descr.	**Mains**	**to display**	**to SSB**
Pin	**CN1**	**CN2**	**CN4**
1	N	Anode_R	+3V3stdby
2	L	n.c.	Standby
3	-	R5 Cathode	GND1
4	-	R4 Cathode	GND1
5	-	R3 Cathode	+12V
6	-	R2 Cathode	+12V
7	-	R1 Cathode	+Vsnd (+24V)
8	-	L1 Cathode	GND_SND
9	-	L2 Cathode	BL-ON-OFF
10	-	L3 Cathode	BL-DIM1 (Vsync)
11	-	L4 Cathode	BL-I-CTRL
12	-	L5 Cathode	POK
13	-	n.c.	+24V (AL2_DVBS)
14	-	Anode_L	GND1
15	-	-	-

Table 7-3 Connector overview 40" sets

	Connector		
no.	**1308**	**1316**	**1M95**
Descr.	**Mains**	**to display**	**to SSB**
Pin	**CN1**	**CN2**	**CN4**
1	N	Anode 1+	+3V3stdby
2	L	n.c.	Standby
3	-	Cathode 1-	GND1
4	-	n.c.	GND1
5	-	Anode 2+	+12V
6	-	n.c.	+12V
7	-	Cathode 2-	+Vsnd (+24V)
8	-	n.c.	GND_SND
9	-	Anode 3+	BL-ON-OFF
10	-	n.c.	BL-DIM1 (Vsync)
11	-	Cathode 3-	BL-I-CTRL
12	-	n.c.	POK
13	-	Anode 4+	+24V (AL2_DVBS)
14	-	n.c.	GND1
15	-	Cathode 4-	-

7.3 DC/DC Converters

The on-board DC/DC converters deliver the following voltages (depending on set execution):

- +3V3-STANDBY, permanent voltage for the Stand-by controller, LED/IR receiver and controls; connector 1M95 pin 1
- +12V, input from the power supply for TV550 common (active mode); connector 1M95 pins 6, 7 and 8
- +24V, input from the power supply for DVB-S2 (in active mode); connector 1M09 pins 1 and 2
- +1V1, core voltage supply for PNX855xx; has to be started up first and switched "off" last (diagram B03B)
- +1V2, supply voltage for analogue blocks inside PNX855xx
- +1V8, supply voltage for DDR2 (diagram B03B)
- +2V5, supply voltage for analogue blocks inside PNX855xx (see diagram B03E)
- +3V3, general supply voltage (diagram B03E)
- +5V, supply voltage for USB and CAM (diagram B03E)
- +5V-TUN, supply voltage for tuner (diagram B03E)
- +V-LNB, input voltage for LNB supply IC (item no. 7T50)
- +5V-DVBS, input intermediate supply voltage for DVB-S2 (diagram B08A)
- +3V3-DVBS, clean voltage for silicon tuner and DVB-S2 channel decoder
- +2V5-DVBS, clean voltage for DVB-S2 channel decoder
- +1V-DVBS, core voltage for DVB-S2 channel decoder.

A +12 V under-voltage detector (see diagram B03C) enables the 12V to 3.3V and 12V to 5V DC/DC converters via the ENABLE-3V3-5V line, and the 12V to 1.8V DC/DC converter via the ENABLE-1V8 line. DETECT2 is the signal going to the Stand-by microcontroller and ENABLE-3V3n is the signal coming from the Stand-by microcontroller.

Diagram B03D contains the following linear stabilizers:

- +2V5 stabilizer, built around item no. 7UCO
- +5V-TUN stabilizer, built around items no. 7UA6 and 7UA7
- +1V2 stabilizer, built around items no. 7UA3 and 7UA4.

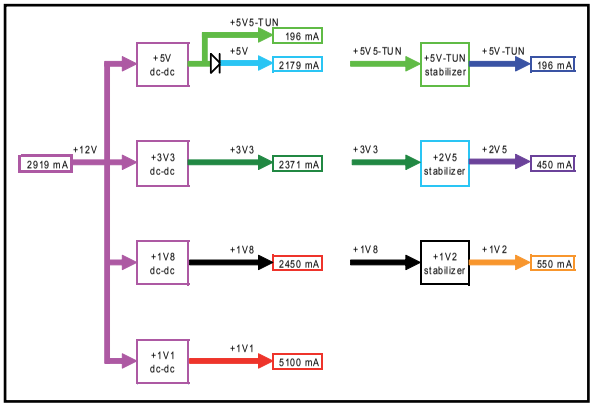
Diagram B08A contains the DVB-S2-related DC/DC converters and -stabilizers:

- a +24V under-voltage detection circuitry is built around item no. 7T04
- the switching frequency of the 24 to 14...20V switched mode converter is 350 kHz (item no. 7T03 and +V-LNB lines)
- the output signal on the +V-LNB line goes to the LNBH23Q (item no. 7T50)
- the LNBH23Q (item no. 7T50) sends a feedback signal via the V0-CNTRL line

- the switching frequency of the +5V-DVBS to +1-DVBS switched mode converter is 900 kHz (item no. 7T00)
- a delay line for the +2V5-DVBS and +1V-DVBS lines is created with item no. 3T03 (R=10k) and 2T06 (C=100n)
- a 3.3V to 2.5V linear stabilizer is built around item no. 7T01
- a 5V to 3.3V linear stabilizer is built around item no. 7T02.

Diagram B08B contains the DVB-S2 LNB supply:
- the +V-LNB signal comes from item no. 7T03
- the V0-CTRL signal goes to item no. 7T03
- the LNB-RF1 goes to the LNB.

Figures gives a graphical representation of the DC/DC converters with its current consumptions:



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100426

Figure 7-3 DC/DC converters

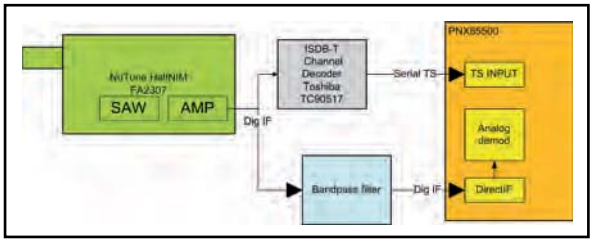
7.4 Front-End Analogue and DVB-T, DVB-C; ISDB-T reception

7.4.1 Brazil region

The Front-End for the Brazil region consist of the following key components:

- Hybrid Tuner with integrated SAW filter and amplifier
- External ISDB-T channel decoder covering the Brazilian digital terrestrial TV standard
- Bandpass filter
- Amplifier
- PNX85500 SoC TV with integrated analogue demodulator.

Below find a block diagram of the front-end application for this region.



18770_236_100127.eps
100219

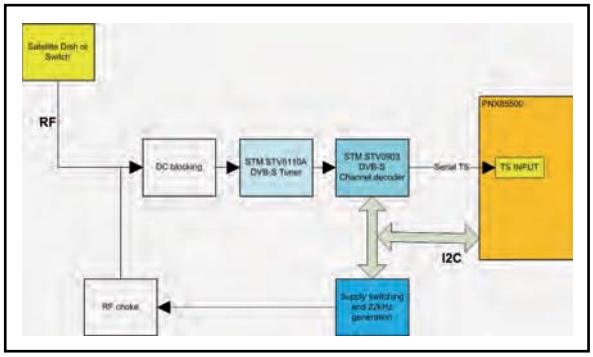
Figure 7-4 Front-End block diagram Brazil region

7.5 Front-End DVB-S(2) reception

The Front-End for the DVB-S(2) application consist of the following key components:

- Satellite Tuner; I^2C address 0xC6 (bridged via channel decoder)
- Channel decoder; I^2C address 0xD0
- LNB switching regulator; I^2C address 0x14
- Amplifier
- PNX855xx SoC TV processor with integrated DVB-T and DVB-C channel decoder and analogue demodulator.

Below find a block diagram of the front-end application for DVB-S(2) reception.



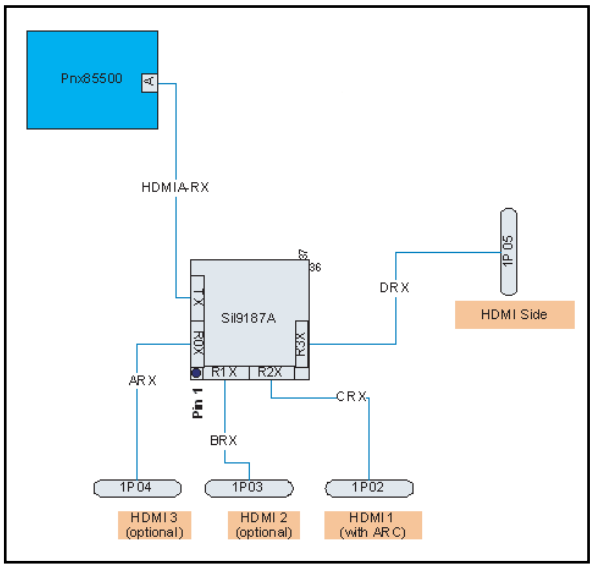
18770_237_100127.eps
100219

Figure 7-5 Front-End block diagram DVB-S(2) reception

This application supports the following protocols:
- Polarization selection via supply voltage (18V = horizontal, 13V = vertical)
- Band selection via “toneburst” (22 kHz): tone “on” = “high” band, tone “off” = “low” band
- Satellite (LNB) selection via DiSEqC 1.0 protocol
- Reception of DVB-S (supporting QPSK encoded signals) and DVB-S2 (supporting QPSK, 8PSK, 16APSK and 32APSK encoded signals), introducing LDPC low-density parity check techniques.

7.6 HDMI

In this platform, the Silicon Image Sil9x87 HDMI multiplexer is implemented. Refer to figure 7-6 HDMI input configuration for the application.



18770_243_100203.eps
100203

Figure 7-6 HDMI input configuration

The following multiplexers can be used:

- Sil9187A (does not support “Instaport” technology for fast switching between input signals)
- Sil9287B (supports “Instaport” technology for fast switching between input signals).

The hardware default I²C addresses are:

- Sil9187A: 0xB0/0xB2 (random: software workaround)
- Sil9287B: 0xB2 (fixed).

The Sil9x87 has the following specifications:

- +5V detection mechanism
- Stable clock detection mechanism
- Integrated EDID
- RT control
- HPD control
- Sync detection
- TMDS output control
- CEC control
- EDID stored in Sil9x87, therefore there are no EDID pins on the SSB.

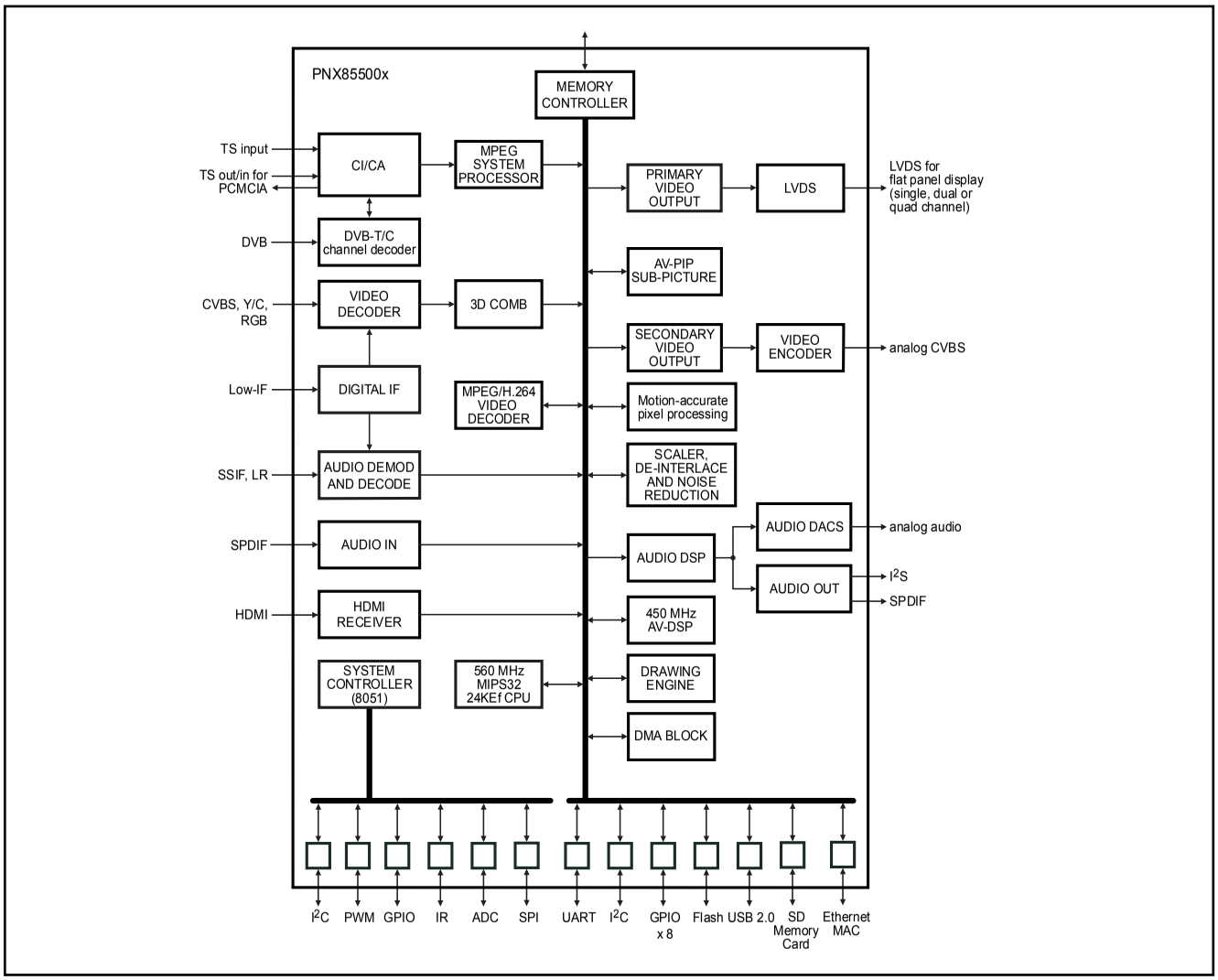
7.7 Video and Audio Processing - PNX855xx

The PNX855xx is the main audio and video processor (or System-on-Chip) for this platform. It has the following features:

- Multi-standard digital video decoder (MPEG-2, H.264, MPEG-4)
- Integrated DVB-T/DVB-C channel decoder
- Integrated CI+
- Integrated motion accurate picture processing (MAPP2)
- High definition ME/MC
- 2D LED backlight dimming option
- Embedded HDMI HDCP keys
- Extended colour gamut and colour booster
- Integrated USB2.0 host controller
- Improved MPEG artefact reduction compared with PNX8543
- Security for customers own code/settings (secure flash).

The TV550 combines front-end video processing functions, such as DVB-T channel decoding, MPEG-2/H.264 decode, analog video decode and HDMI reception, with advanced back-end video picture improvements. It also includes next generation Motion Accurate Picture Processing (MAPP2). The MAPP2 technology provides state-of-the-art motion artifact reduction with movie judder cancellation, motion sharpness and vivid colour management. High flat panel screen resolutions and refresh rates are supported with formats including 1366 × 768 @ 100Hz/120Hz and 1920 × 1080 @ 100Hz/120Hz. The combination of Ethernet, CI+ and H.264 supports new TV experiences with IPTV and VOD. On top of that, optional support is available for 2D dimming in combination with LED backlights for optimum contrast and power savings up to 50%.

For a functional diagram of the PNX855xx, refer to Figure 7-7.



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100219

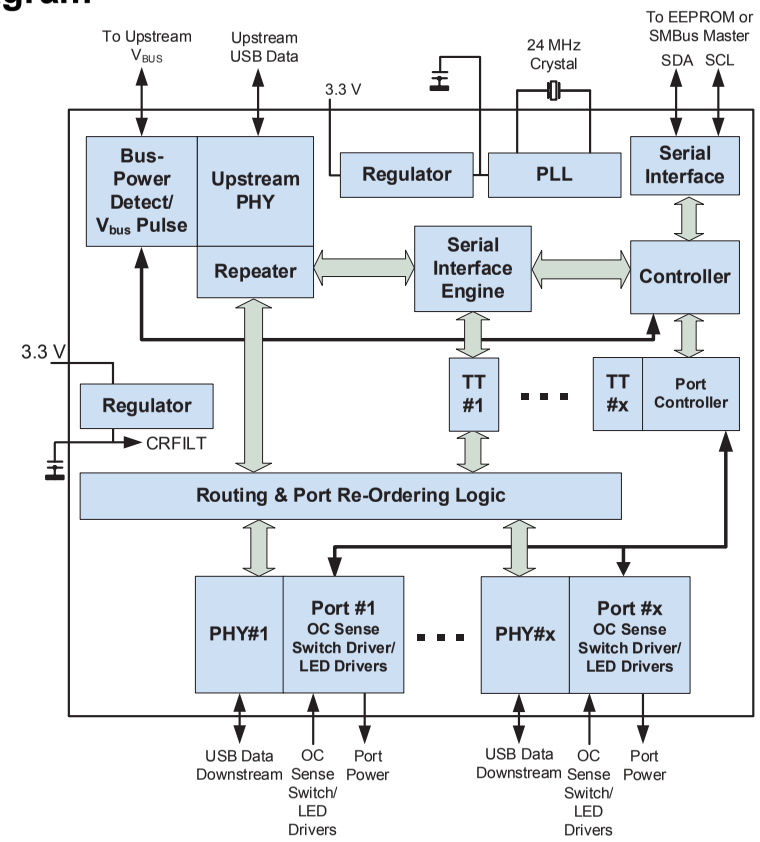
Figure 7-7 PNX855xx functional diagram

8. IC Data Sheets

This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

8.1 Diagram USB Hub B01C, USB2513B (IC 7F25)

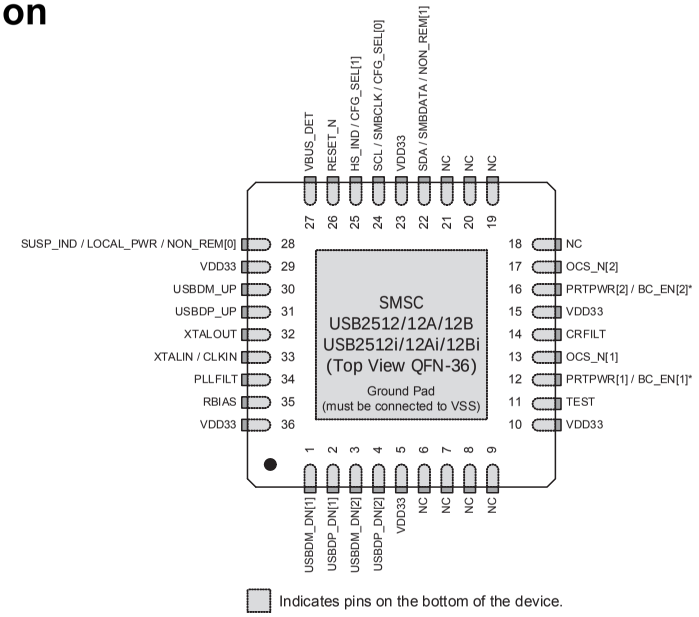
Block diagram



The ‘x’ indicates the number of available downstream ports: 2, 3, 4, or 7.

Note : The LED port indicators only apply to USB2513i.

Pinning information

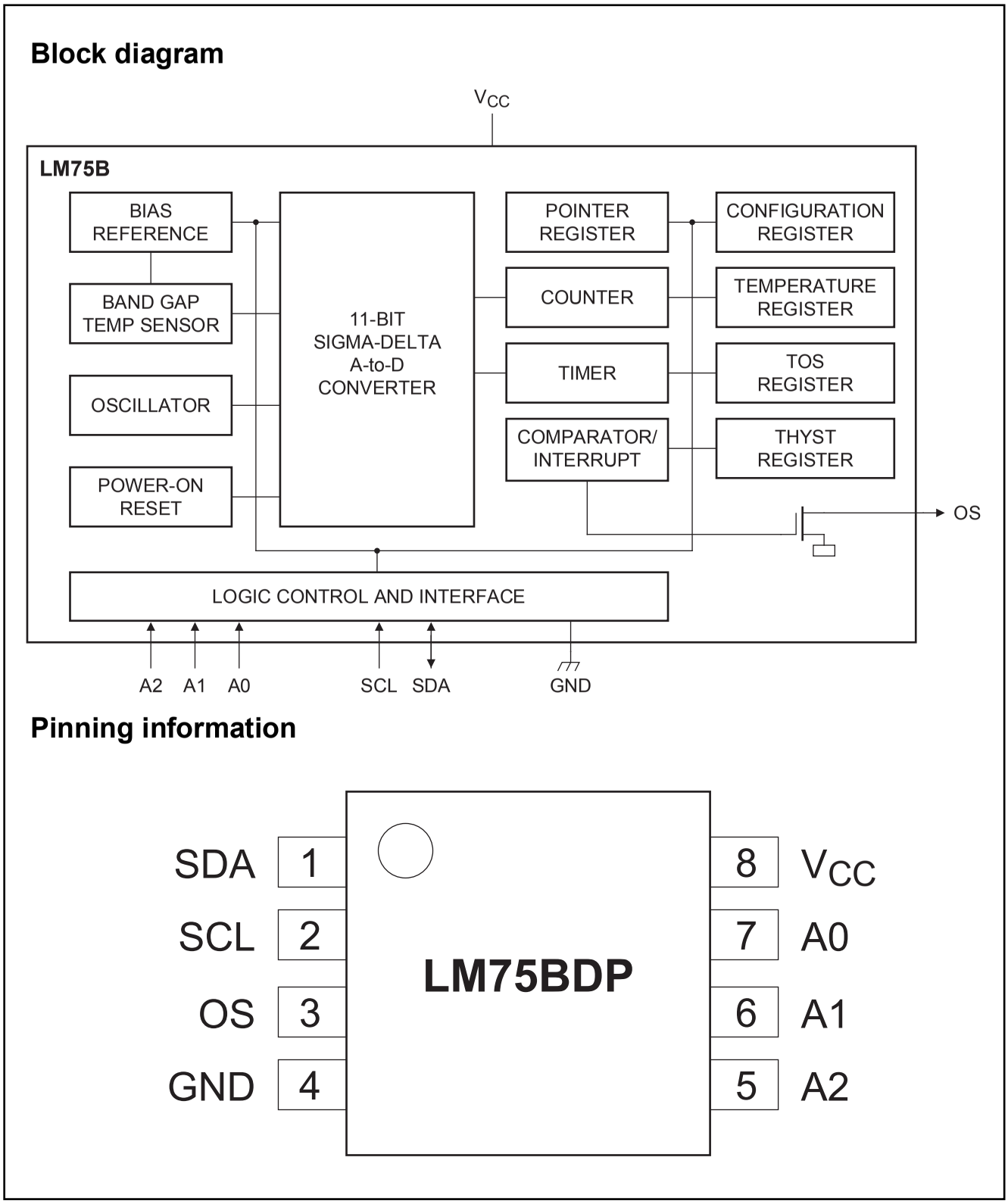


18770_301_100217.eps
100217

Figure 8-1 Internal block diagram and pin configuration

back to div. table

8.2 Diagram Temp sensor & headphone B01J, LM75BDP (IC 7FD1)

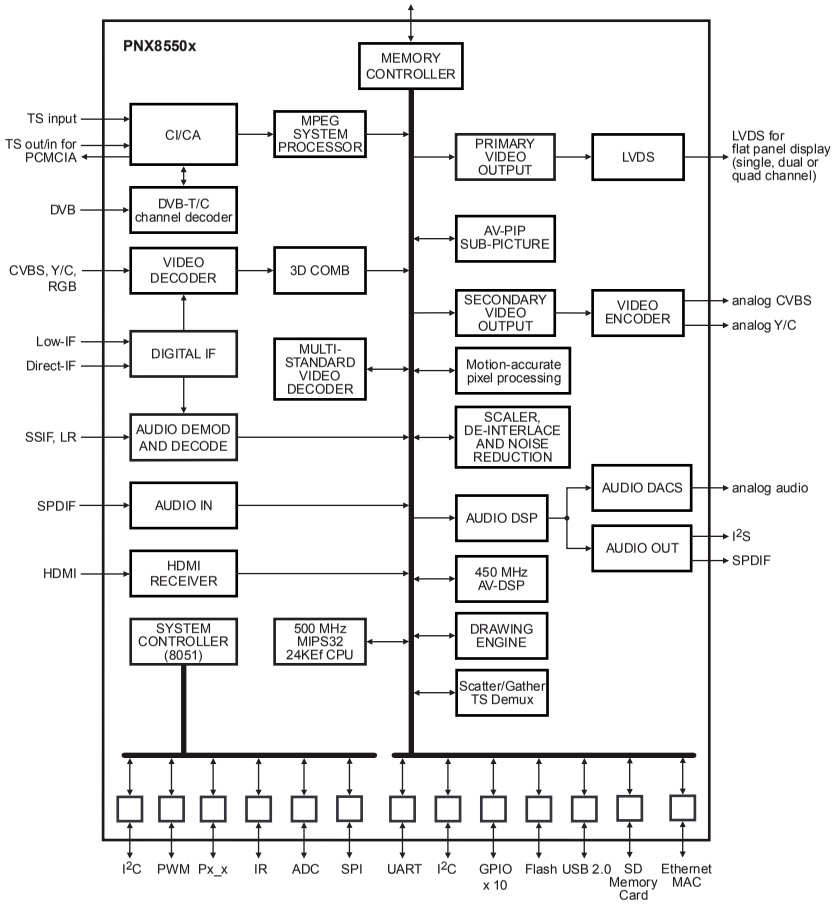


18770_300_100217.eps
100217

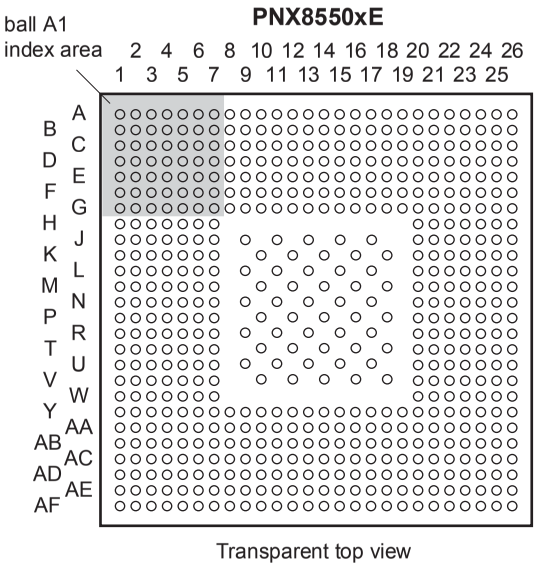
Figure 8-2 Pin configuration

8.3 Diagram NANDflash - conditional access B02A, PNX855xx (IC7S00)

Block diagram



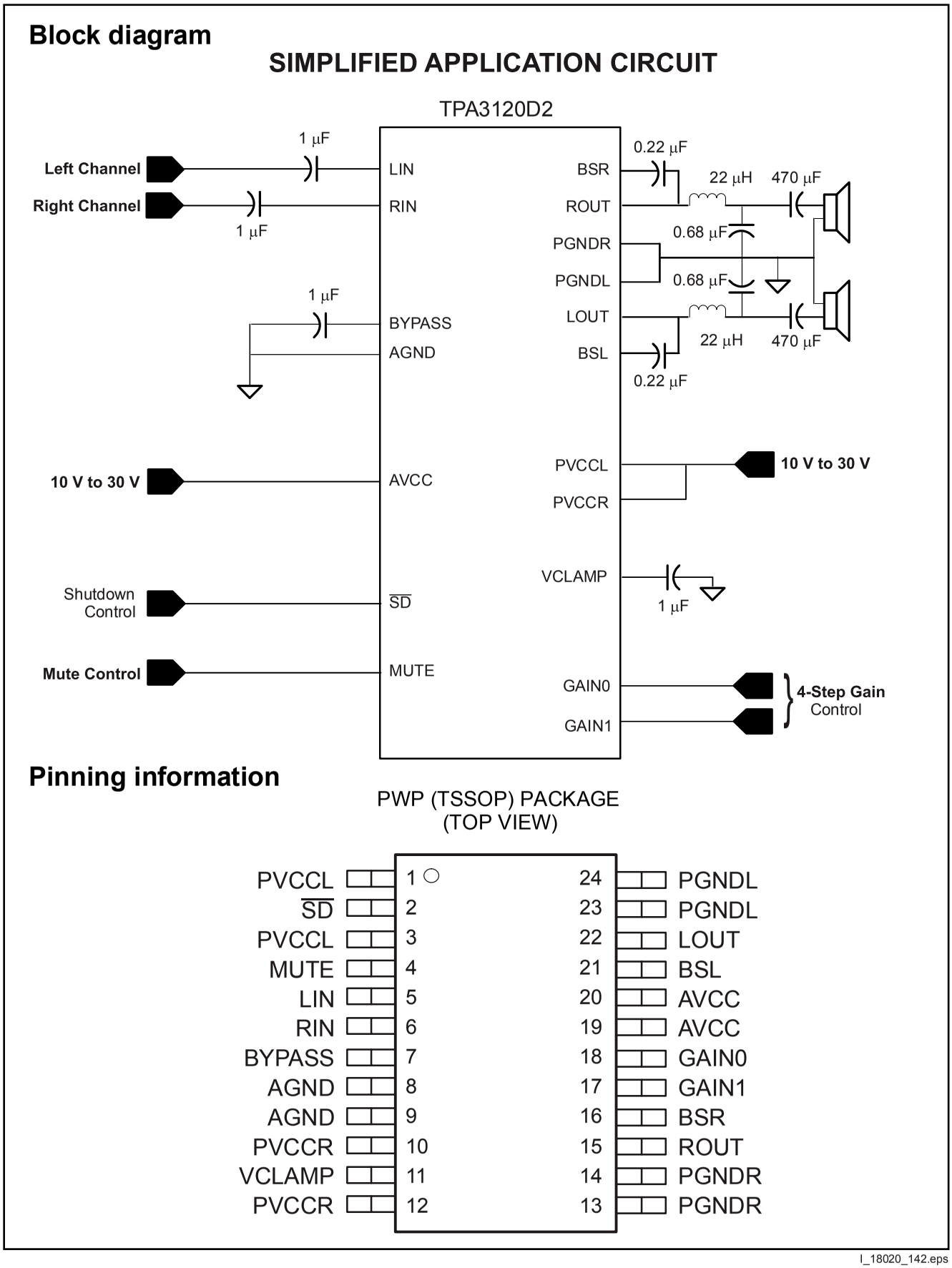
Pinning information



18770_308_100217.eps
100217

Figure 8-3 Internal block diagram and pin configuration

8.4 Diagram Audio B03A, TPA312xD2PWP (IC7D10)



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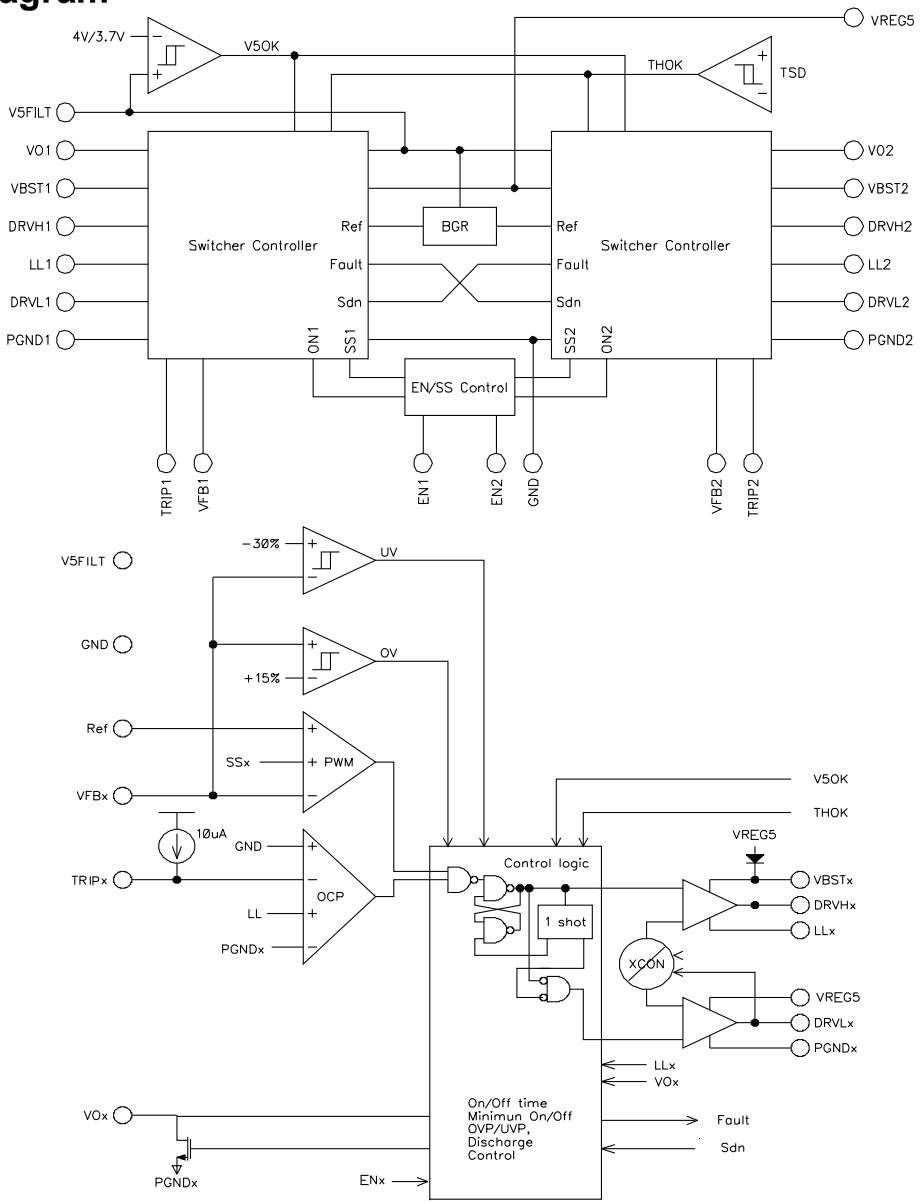
100402

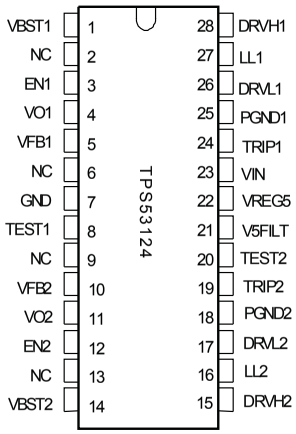
Figure 8-4 Internal block diagram and pin configuration

8.5 Diagram DC/DC B03B, TPS53126PW (IC7U03)

Block diagram



Pinning information



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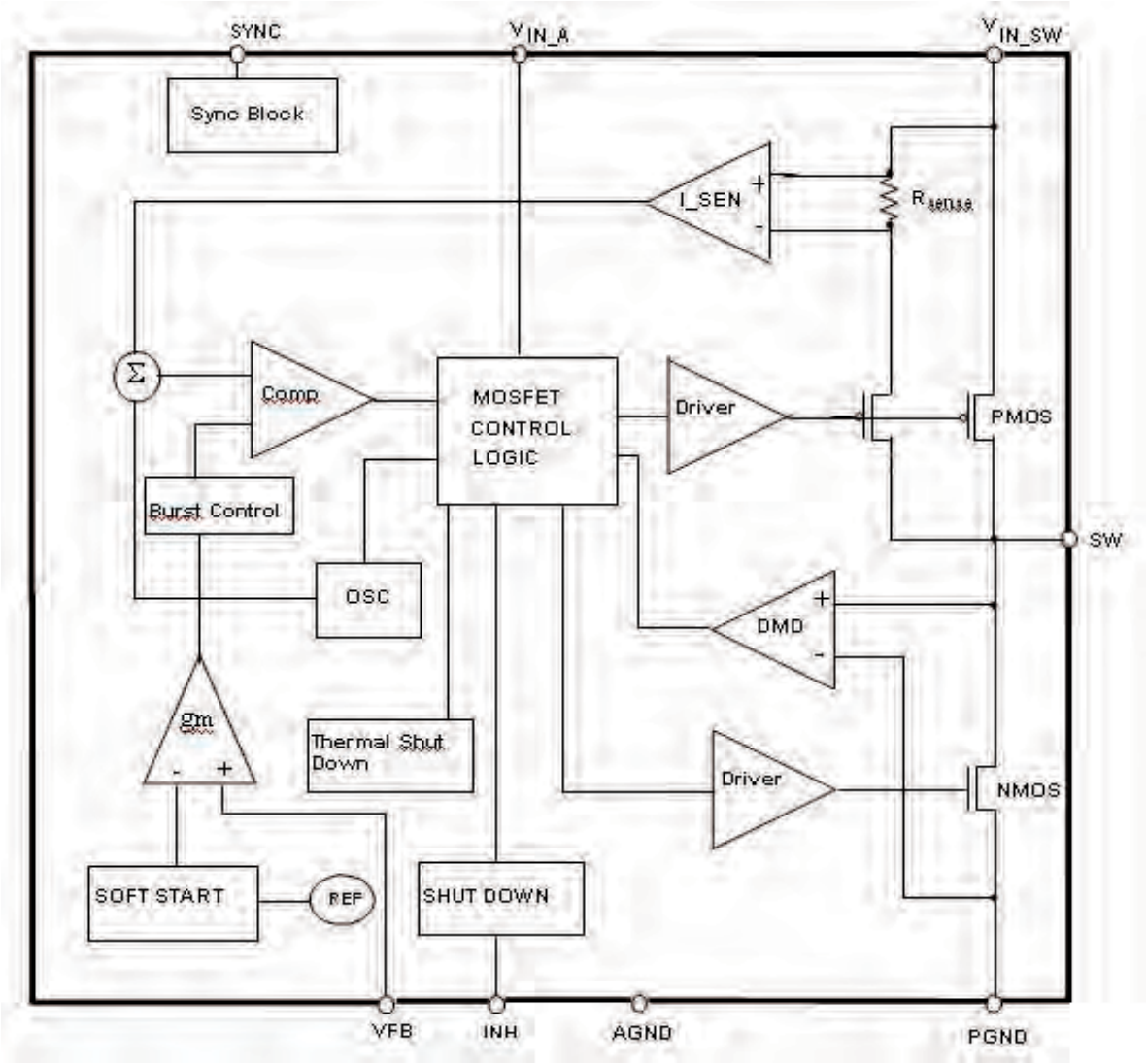
100416

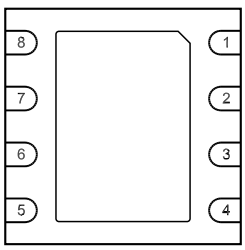
Figure 8-5 Internal block diagram and pin configuration

8.6 Diagram DC/DC B03E, ST1S10PH (IC 7UD0)

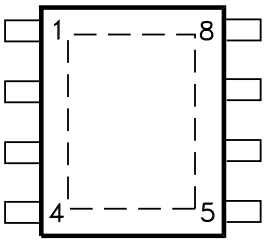
Block diagram



Pinning information



DFN8 (4 × 4)



PowerSO-8

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100402

Figure 8-6 Internal block diagram and pin configuration

8.7 Diagram DC/DC B03E, LD1117DT25 (IC 7UD2)

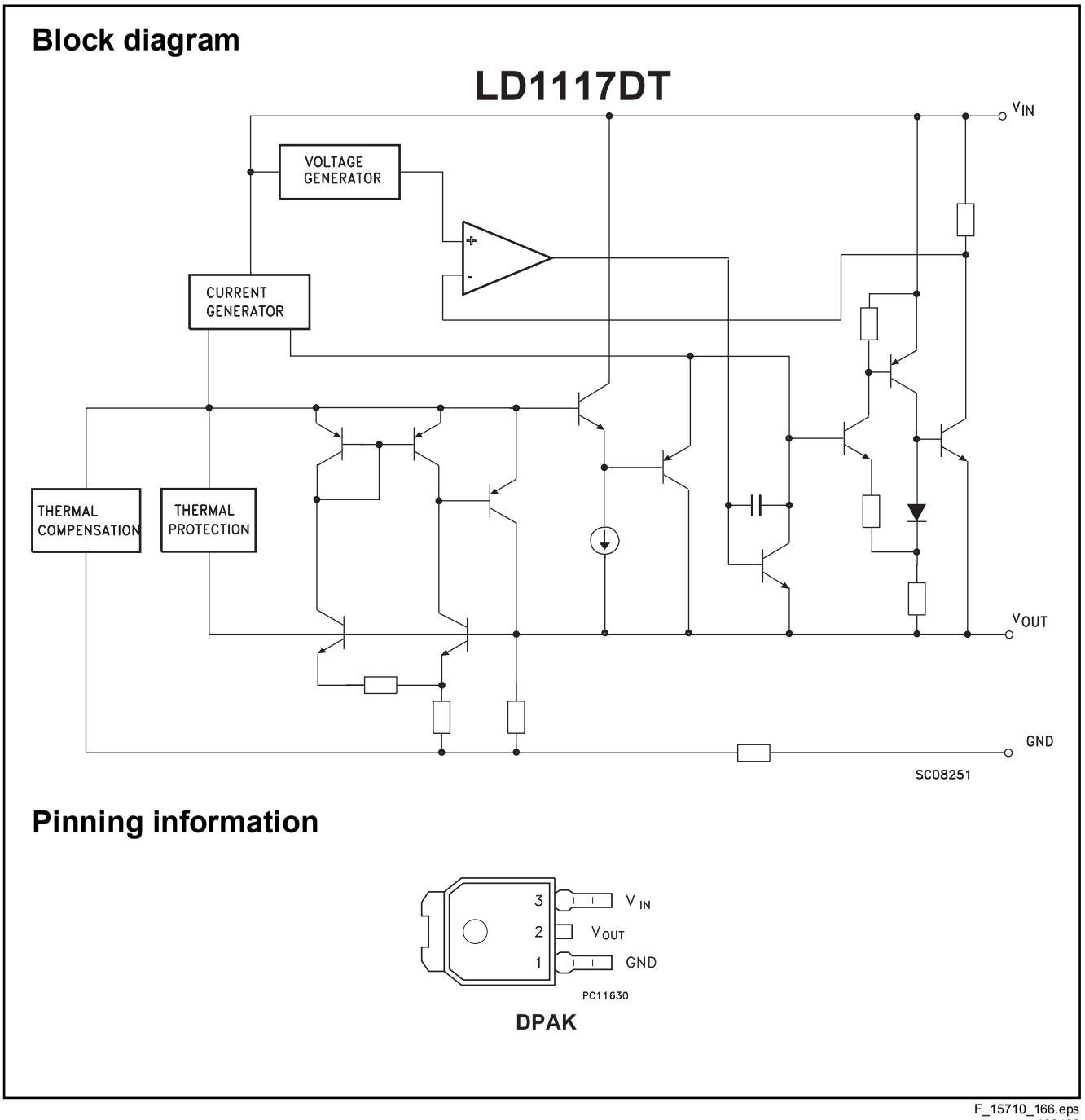
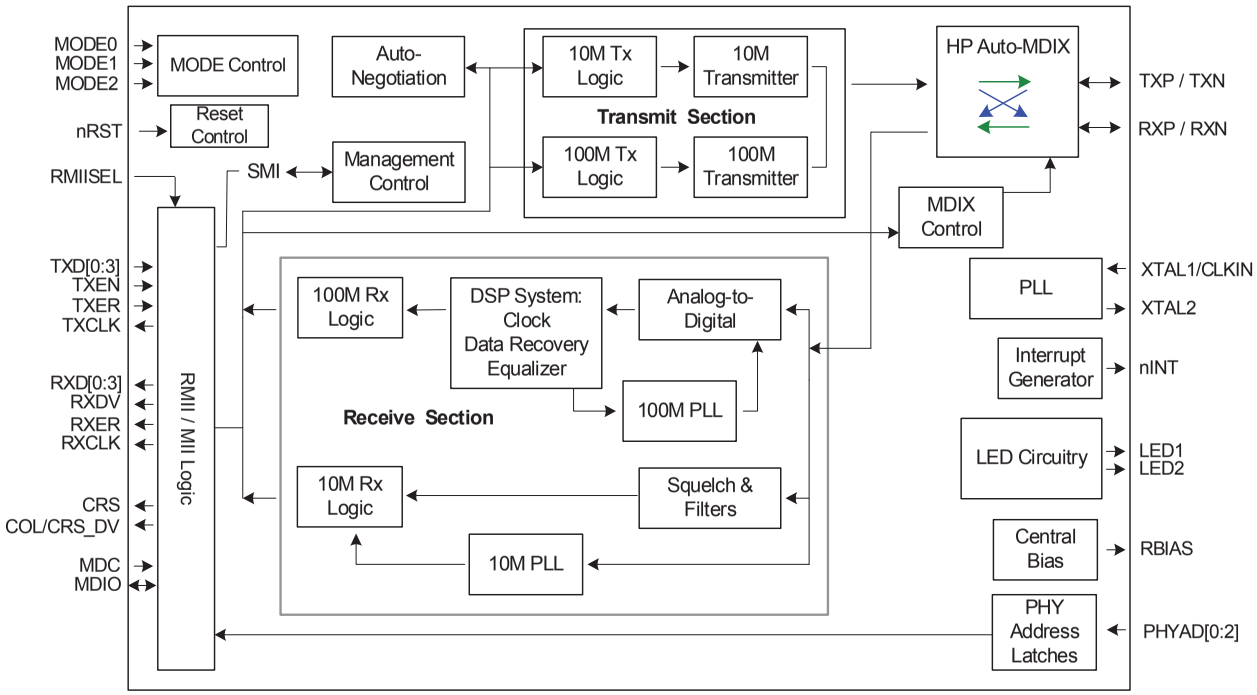


Figure 8-7 Internal block diagram and pin configuration

8.8 Diagram Ethernet & Service B04C, LAN8710A-EZKH (IC 7E10)

Block diagram



Pinning information

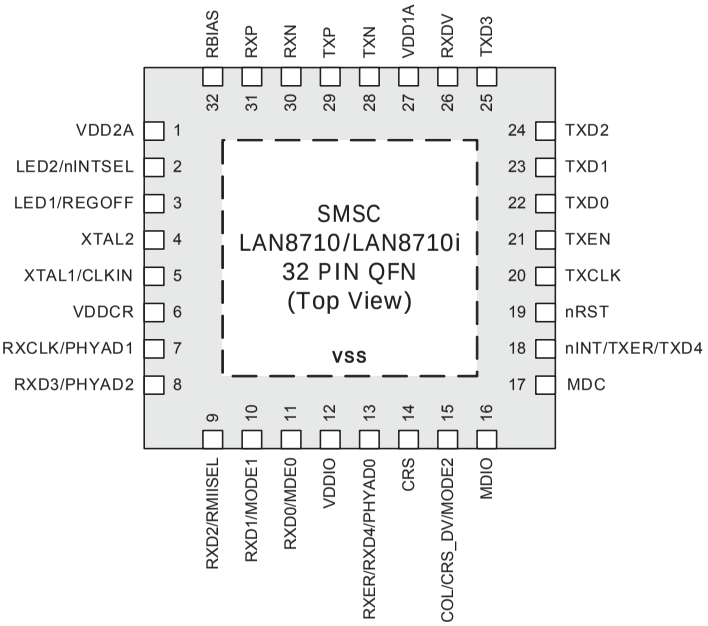


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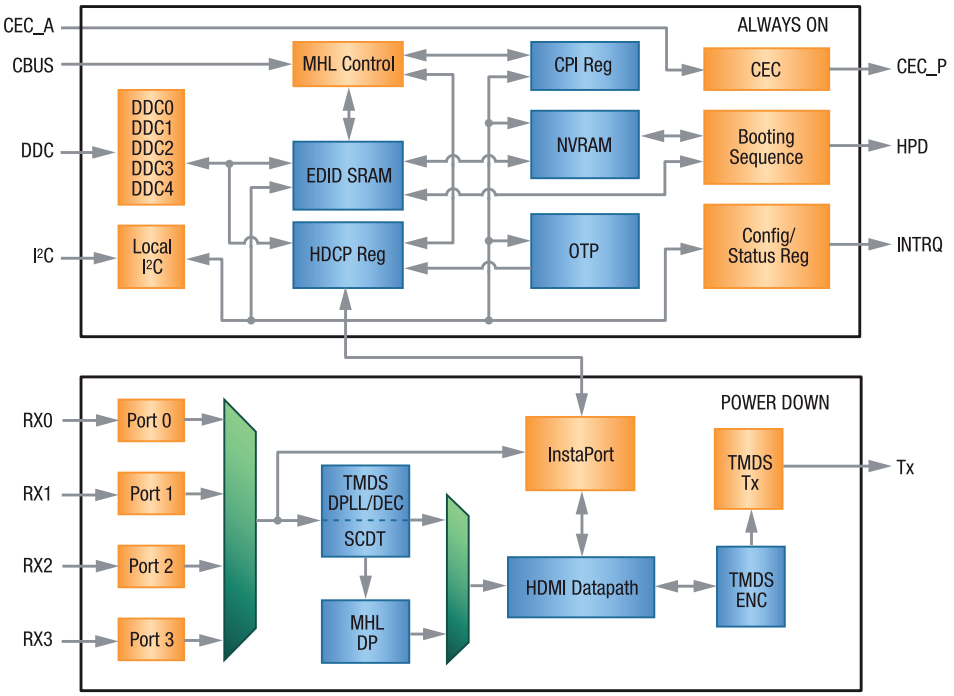
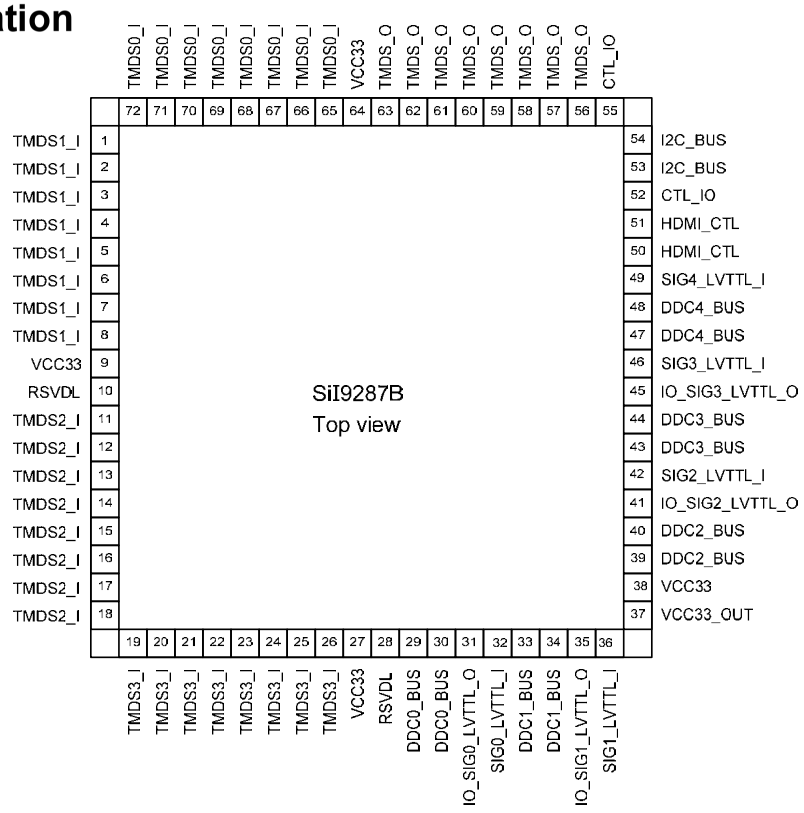
Figure 8-8 Internal block diagram and pin configuration

8.9 Diagram HDMI B04D, SII9x87B (IC 7EC1)

Block diagram



Pinning information



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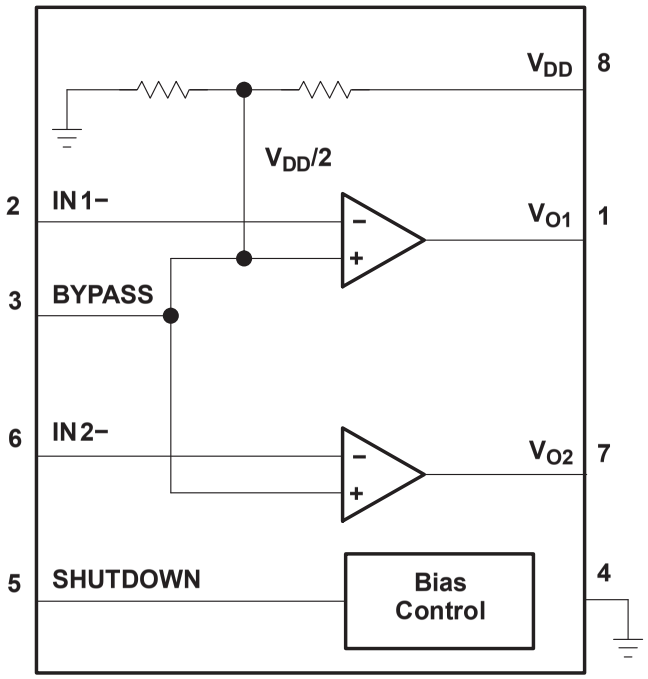
100217

Figure 8-9 Internal block diagram and pin configuration

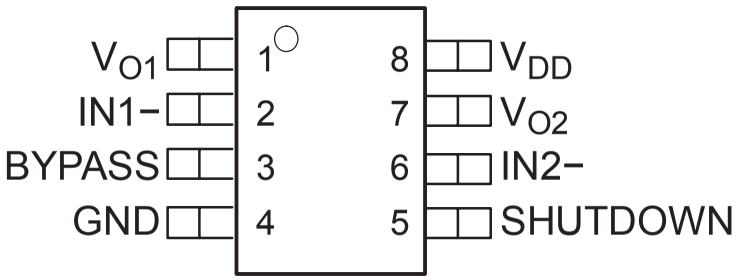
8.10 Diagram Headphone B04E, TPA6111A2DGN (IC 7EE1)

Block diagram



Pinning information

D OR DGN PACKAGE
(TOP VIEW)



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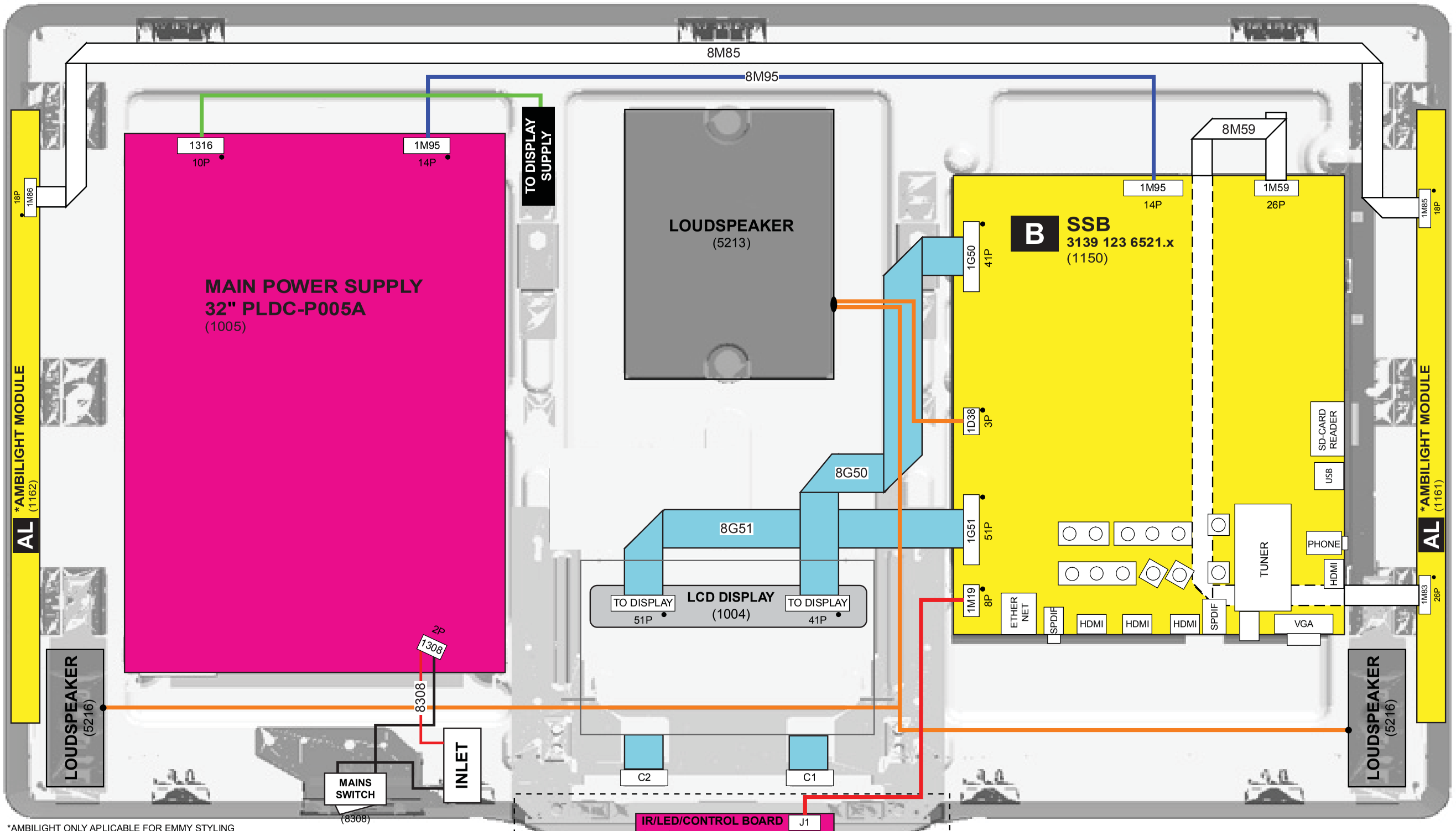
100217

Figure 8-10 Internal block diagram and pin configuration

9. Block Diagrams

9-1 Wiring diagram Blockbuster/Emmy 32"

WIRING DIAGRAM 32" BLOCKBUSTER / EMMY



*AMBILIGHT ONLY APLICABLE FOR EMMY STYLING

1316 (PSU)
1. ANODE 1
2. NC
3. CATHODE 1
4. GND
5. ANODE 2
6. NC
7. CATHODE 2
8. NC
9. ANODE 3
10. NC
11. CATHODE 3
12. NC
13. ANODE 4
14. NC
15. CATHODE 4

1M95 (PSU)
1. +3V3STDBY
2. STANDBY
3. GND
4. GND
5. +12V
6. +12V
7. +VSND
8. GND_SND
9. BL-ON-OFF
10. BL-DIM1
11. BL-I-CTRL
12. POK
13. +24V
14. GND1

1308 (PSU)
1. N
2. L

1M95 (B03C)
1. +3V3-STANDBY
2. STANDBY
3. GND
4. GND
5. +12VIN
6. +12VIN
7. +24V-AUDIO-POWER
8. GND
9. LAMP-ON
10. BACKLIGHT-PWM_BL-VS
11. BACKLIGHT-BOOST
12. POWER-OK
13. +24V
GND

1D38 (B03A)
1. LEFT-SPEAKER
2. GND-AUDIO
3. RIGHT-SPEAKER

1G51 (B06B)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51. CTRL-DISP

1M19 (B09A)
1. LIGHT-SENSOR
2. GND
3. RC
4. LED-2
5. +3V3-STANDBY
6. LED-1
7. KEYBOARD
8. +5V

1M59 (B09A)

1. AMBI-SPI-CLK-OUT	15. GND_AL
2. GND	16. GND_AL
3. AMBI-SPI-SDO-OUT	17. GND_AL
4. AMBI-SPI-SDI-OUT-GI	18. GND_AL
5. V-AMBI	19. GND_AL
6. AMBI-PWM-CLK_B2	20. N.C.
7. GND	21. +24V
8. AMBI-SPI-CS-OUTn_R2	22. +24V
9. AMBI-LATCH1_G2	23. +24V
10. V-AMBI	24. +24V
11. AMBI-BLANK_R1	25. +24V
12. AMBI-PROG_B1	26. +24V
13. AMBI-LATCH2_DIS	
14. AMBI-TEMP	

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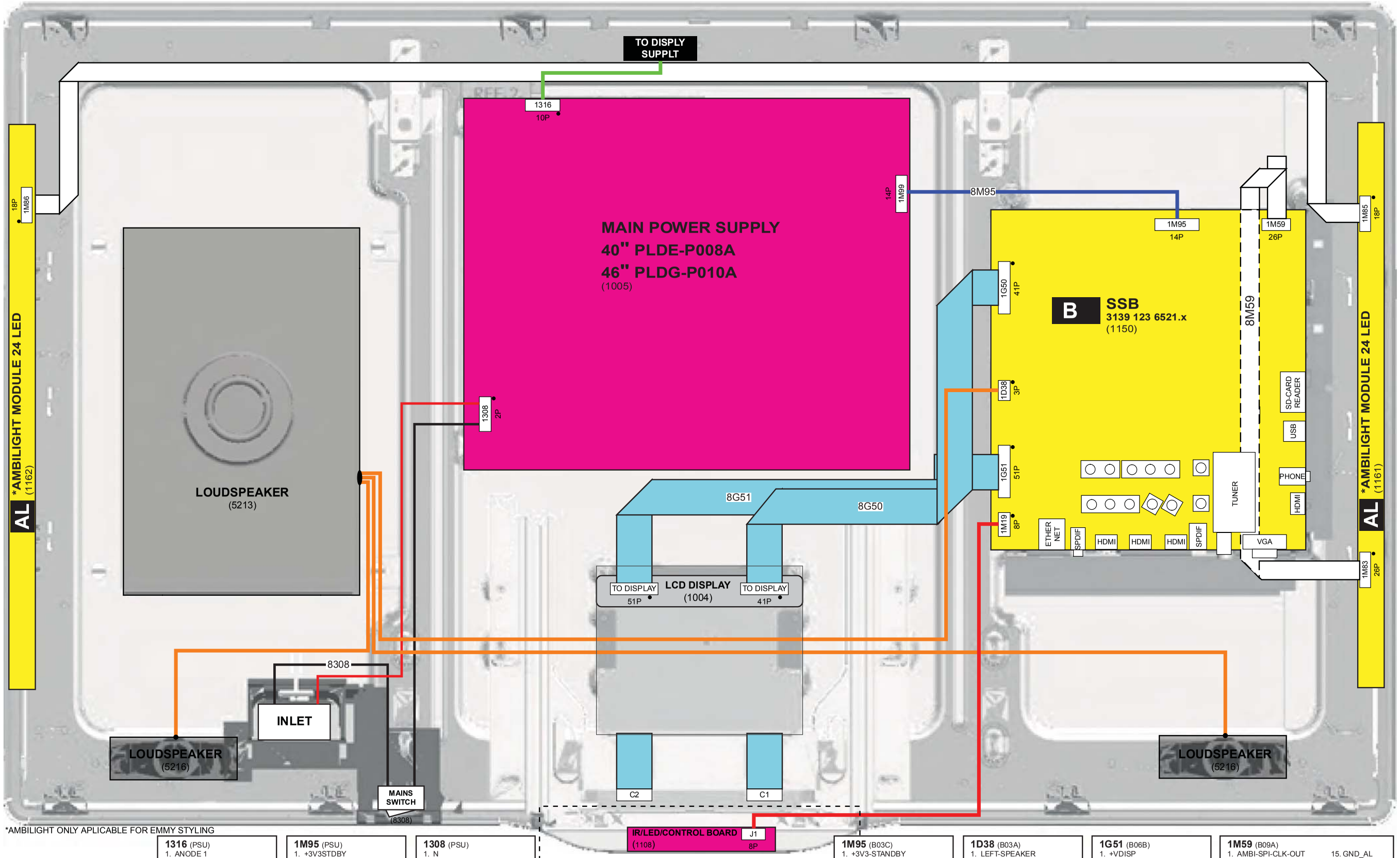
110421

9-2 Wiring diagram Blockbuster/Emmy 40" - 46"

WIRING DIAGRAM 40"- 46" BLOCKBUSTER / EMMY



*AMBILIGHT ONLY APLICABLE FOR EMMY STYLING

1316 (PSU)
1. ANODE 1
2. NC
3. CATHODE 1
4. GND
5. ANODE 2
6. NC
7. CATHODE 2
8. NC
9. ANODE 3
10. NC
11. CATHODE 3
12. NC
13. ANODE 4
14. NC
15. CATHODE 4

1M95 (PSU)
1. +3V3STDBY
2. STANDBY
3. GND
4. GND
5. +12V
6. +12V
7. +VSND
8. GND_SND
9. BL-ON-OFF
10. BL-DIM1
11. BL-I-CTRL
12. POK
13. +24V
14. GND1

1308 (PSU)
1. N
2. L

1M95 (B03C)
1. +3V3-STANDBY
2. STANDBY
3. GND
4. GND
5. +12VIN
6. +12VIN
7. +24V-AUDIO-POWER
8. GND
9. LAMP-ON
10. BACKLIGHT-PWM_BL-VS
11. BACKLIGHT-BOOST
12. POWER-OK
13. +24V
GND

1D38 (B03A)
1. LEFT-SPEAKER
2. GND-AUDIO
3. RIGHT-SPEAKER

1M19 (B09A)
1. LIGHT-SENSOR
2. GND
3. RC
4. LED-2
5. +3V3-STANDBY
6. LED-1
7. KEYBOARD
8. +5V

1G51 (B06B)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51. CTRL-DISP

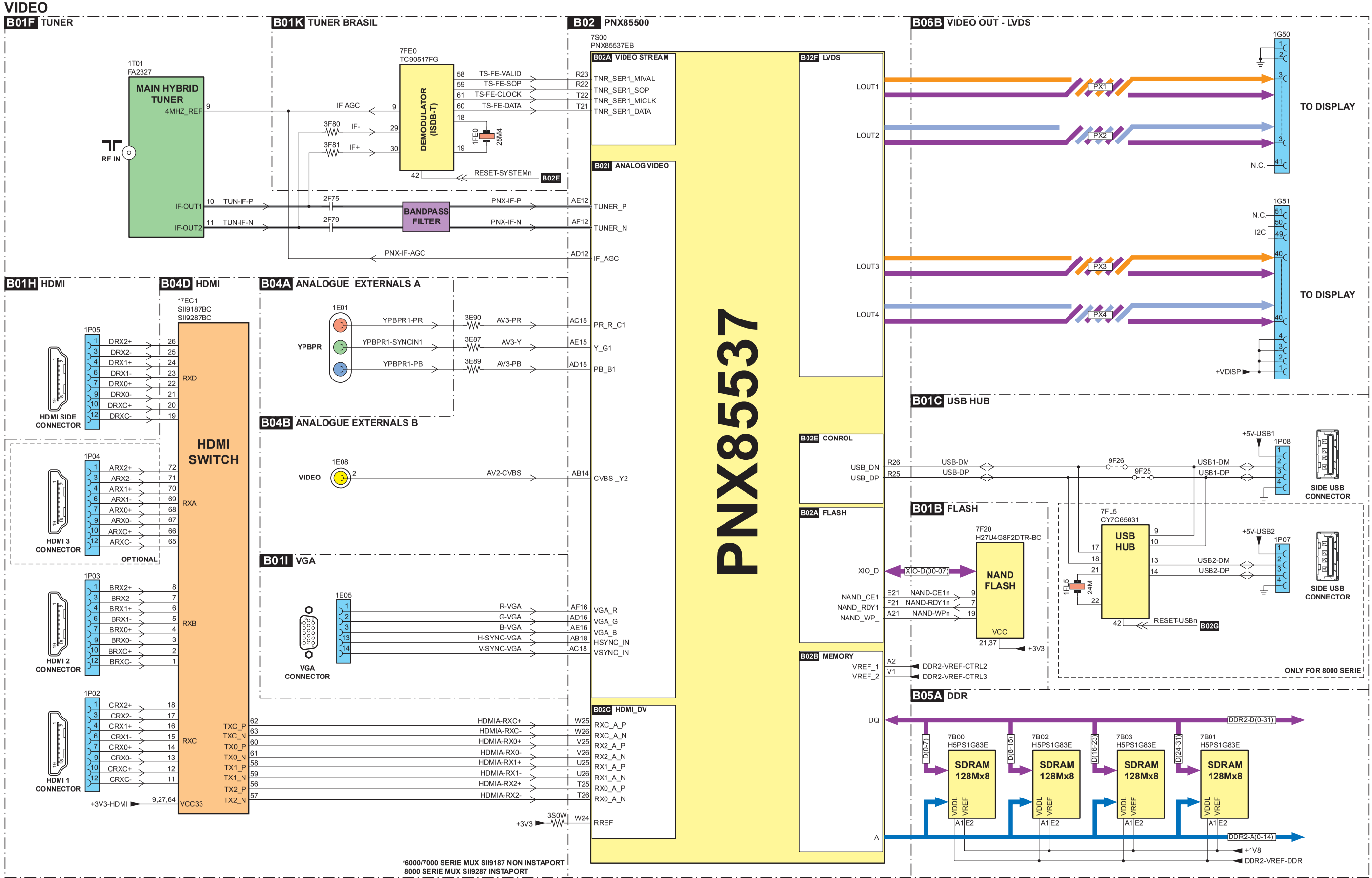
1M59 (B09A)

1. AMBI-SPI-CLK-OUT	15. GND_AL
2. GND	16. GND_AL
3. AMBI-SPI-SDO-OUT	17. GND_AL
4. AMBI-SPI-SDI-OUT-GI	18. GND_AL
5. V-AMBI	19. GND_AL
6. AMBI-PWM-CLK_B2	20. N.C.
7. GND	21. +24V
8. AMBI-SPI-CS-OUTn_R2	22. +24V
9. AMBI-LATCH1_G2	23. +24V
10. V-AMBI	24. +24V
11. AMBI-BLANK_R1	25. +24V
12. AMBI-PROG_B1	26. +24V
13. AMBI-LATCH2_DIS	
14. AMBI-TEMP	

19110_009_110323.eps
110421

9-3 Block Diagram Video

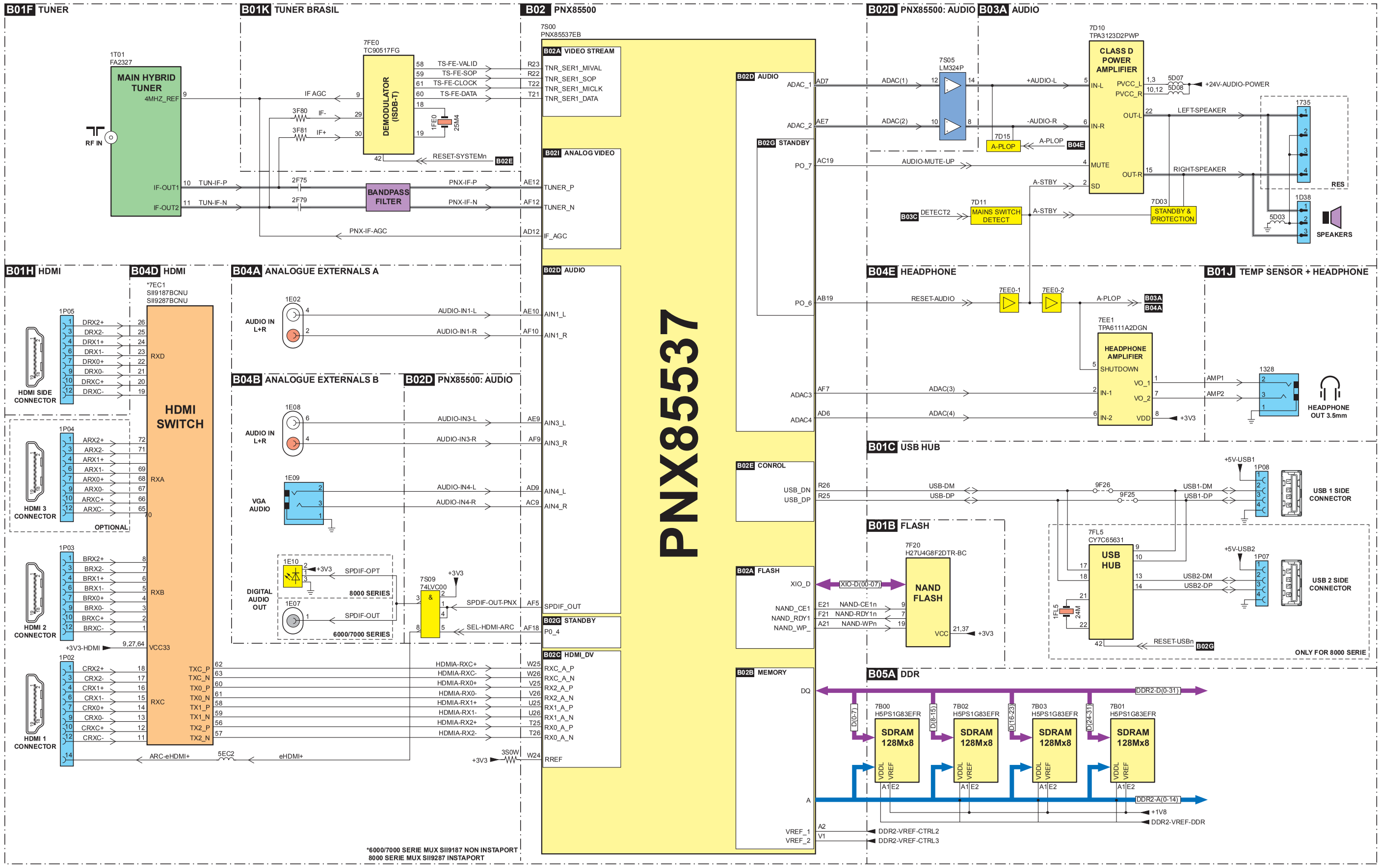
VIDEO



19110_005_110309.eps
110321

9-4 Block Diagram Audio

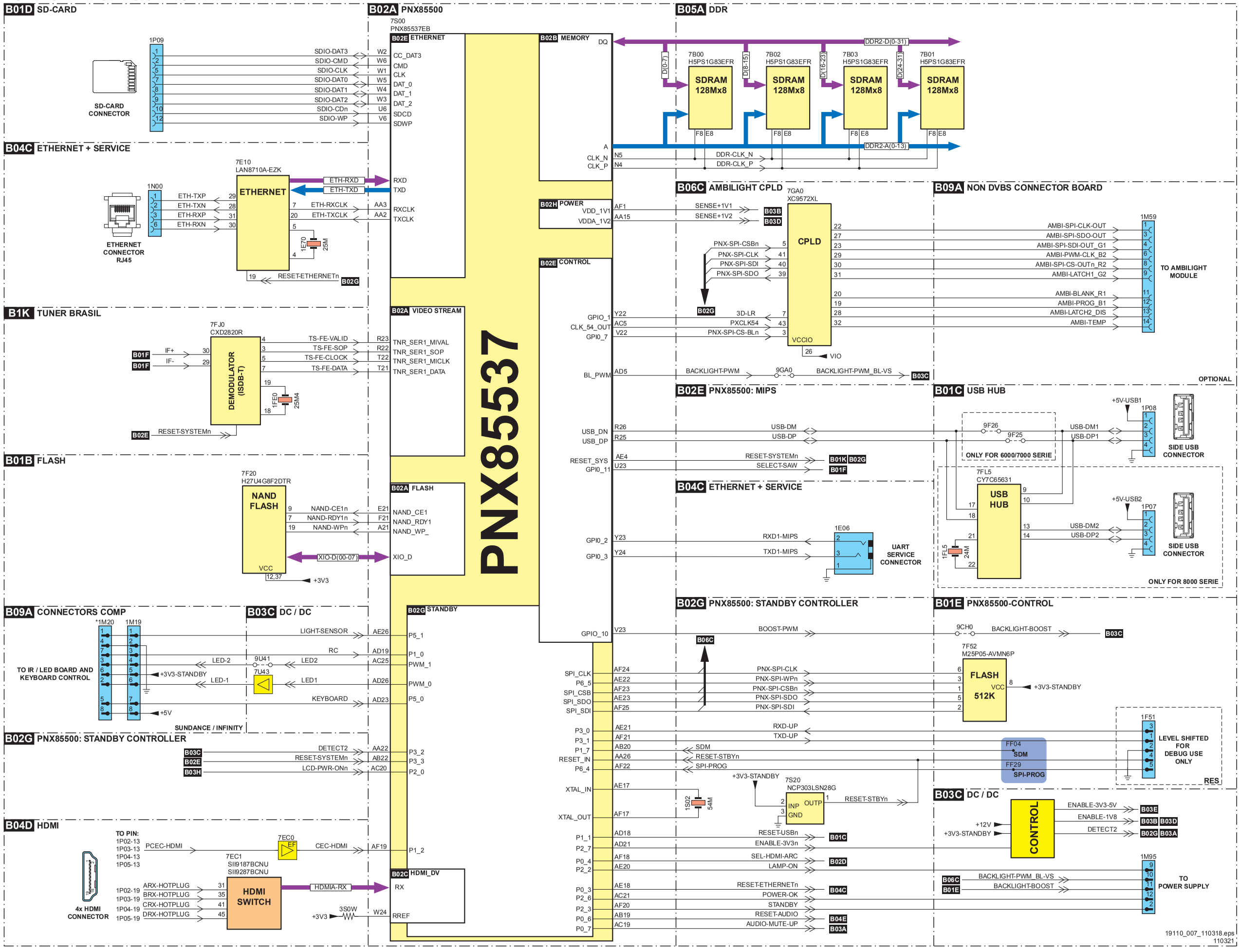
AUDIO



19110_006_110309.eps
110321

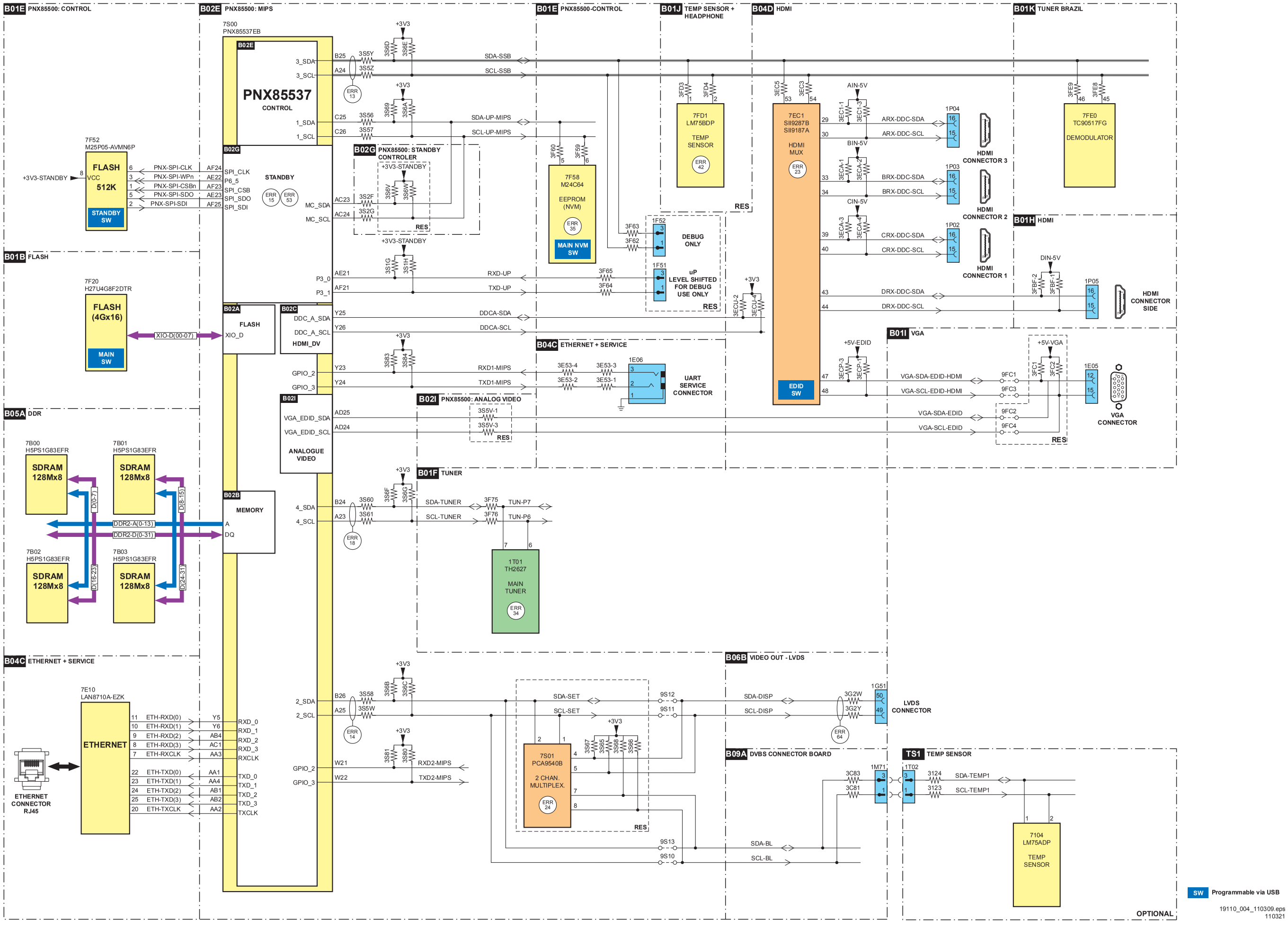
9-5 Block Diagram Control & Clock Signals

CONTROL + CLOCK SIGNALS



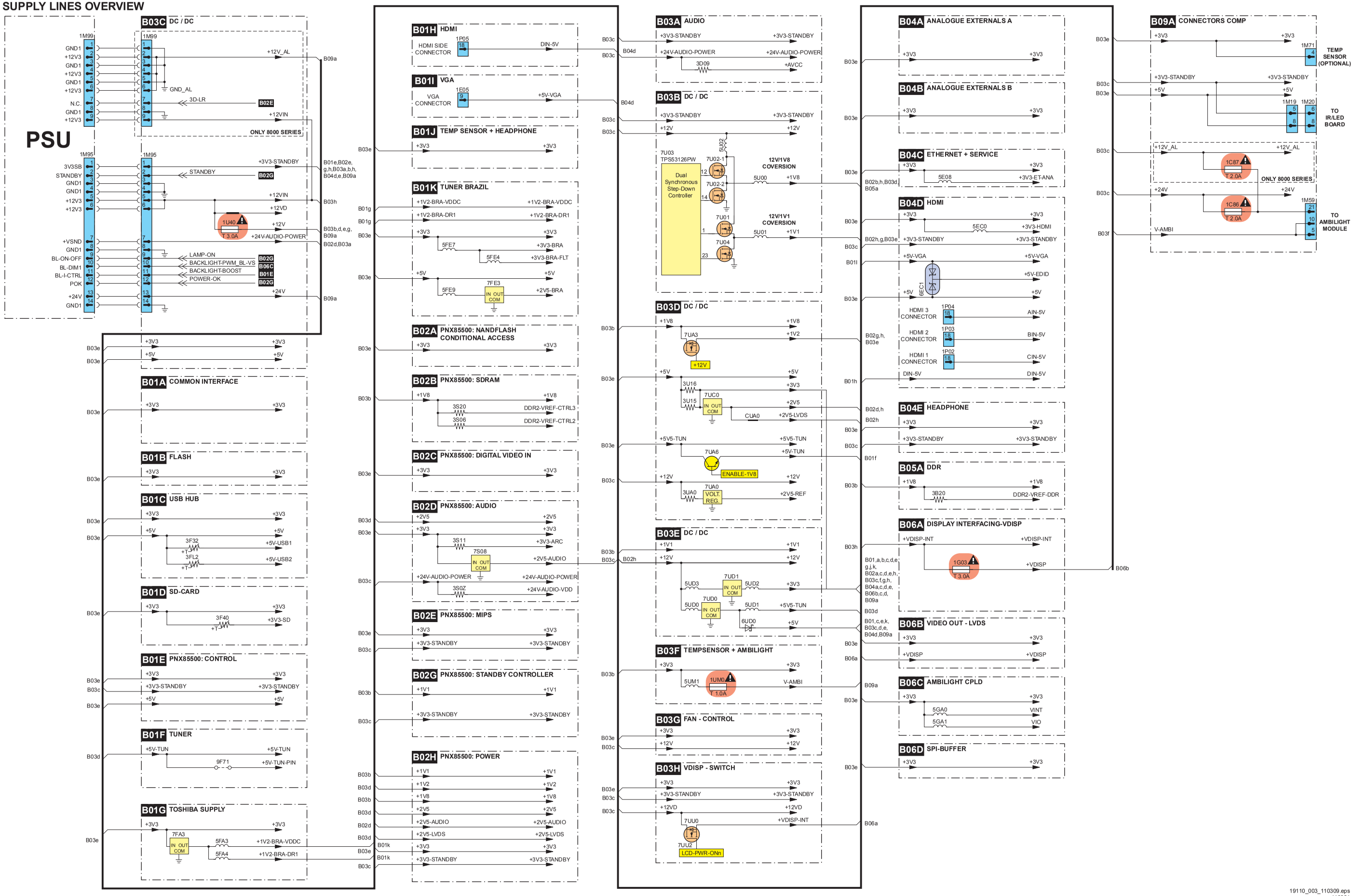
9-6 Block Diagram I²C

I²C



9-7 Supply Lines Overview

SUPPLY LINES OVERVIEW



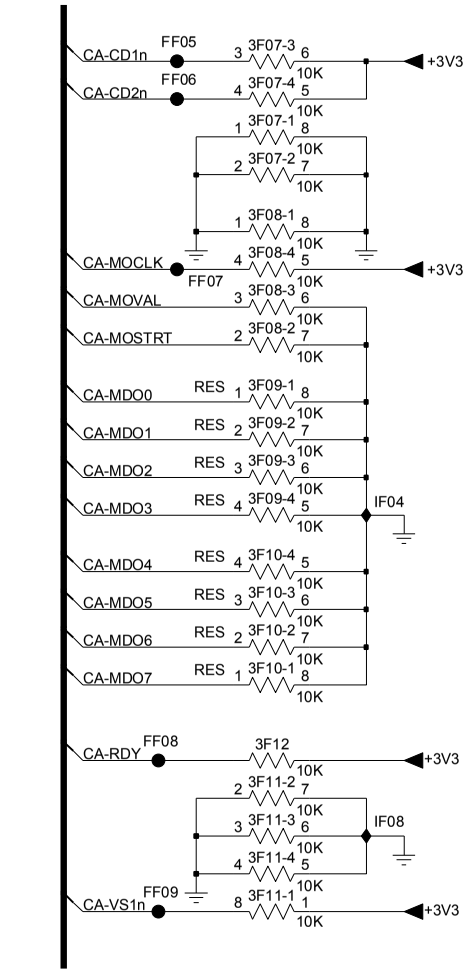
19110_003_110309.eps
110321

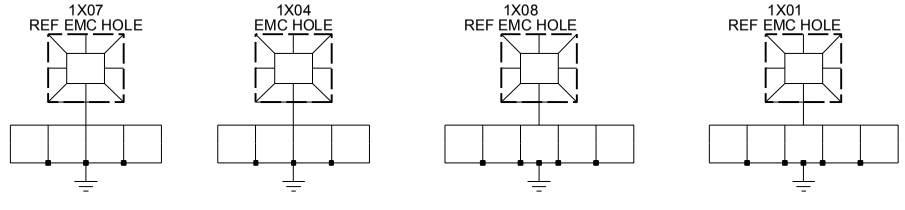
10. Circuit Diagrams and PWB Layouts

10-1 B01 393912365213
Common Interface

B01A Common Interface

B01A





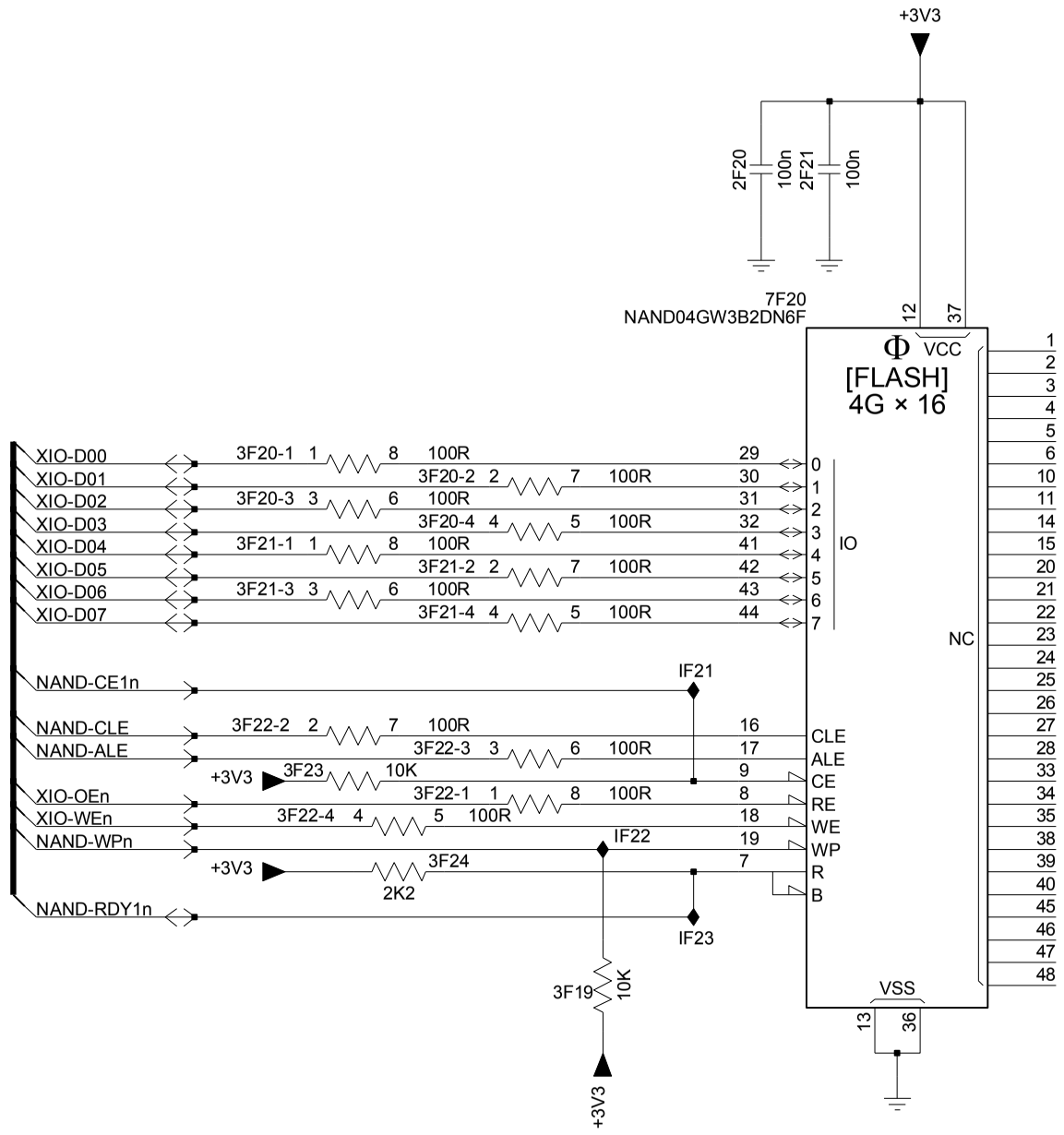
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_010_110411.eps
110415

Flash

B01B Flash

B01B



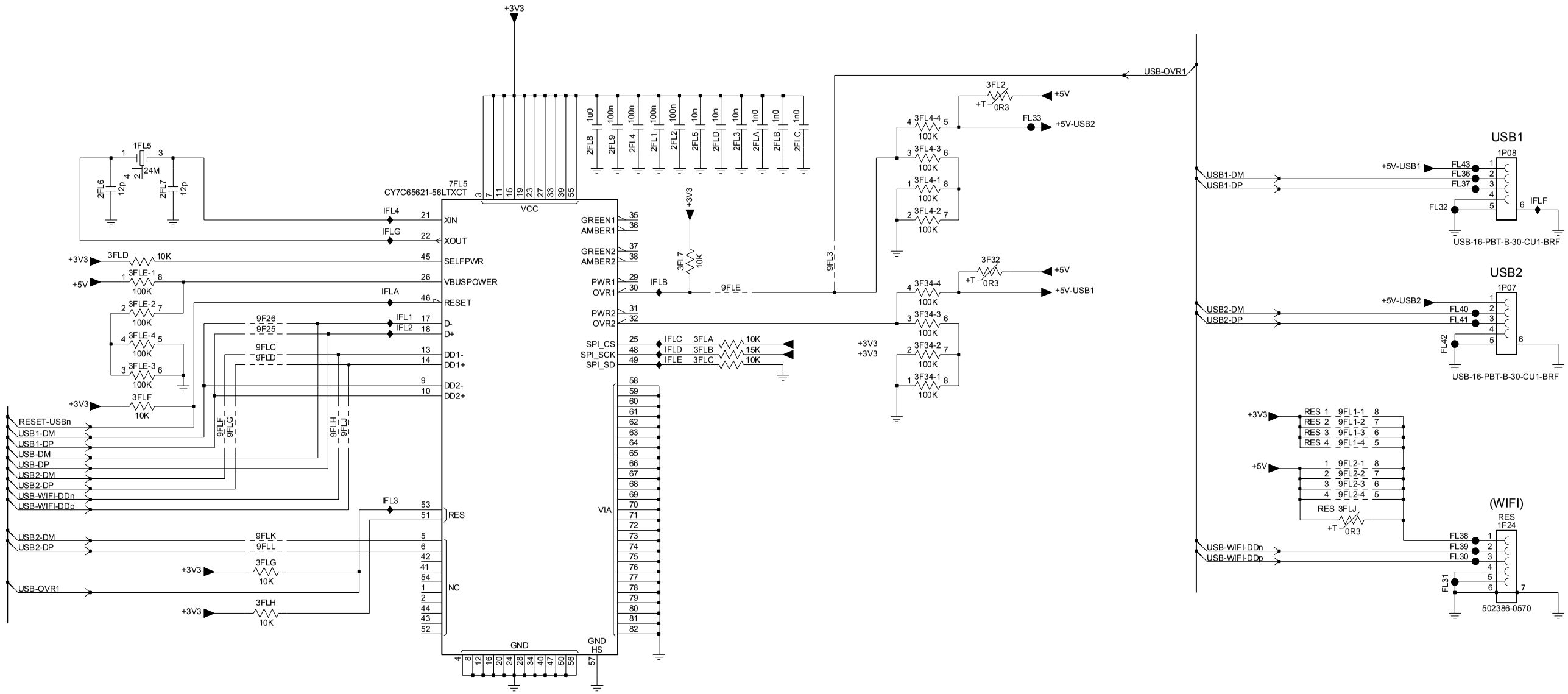
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_011_110411.eps
110415

USB Hub

B01C USB Hub

B01C



SCENARIO	1P07	1P08	1F24	3FLG	3FL2	3FL4	3FL7	3F32	3F34	7FL5	9FLE	9FLC/D	9F25/6	9FL2	9FL3	9FLF/G	9FLH/J	9FLK/L
1x USB	N	Y	N	N	N	N	N	Y	N	-	N	N	Y	N	N	N	N	N
1x USB + WIFI	N	Y	Y	Y	N	N	Y	Y	Y	CY7C65621	N	N	N	Y	N	N	Y	N
2x USB	Y	Y	N	Y	Y	Y	N	Y	Y	CY7C65621	Y	Y	N	N	N	Y	N	N
2x USB + WIFI	Y	Y	Y	N	Y	Y	Y	Y	Y	CY7C65631	N	N	N	Y	Y	N	Y	Y

SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_012_110411.eps
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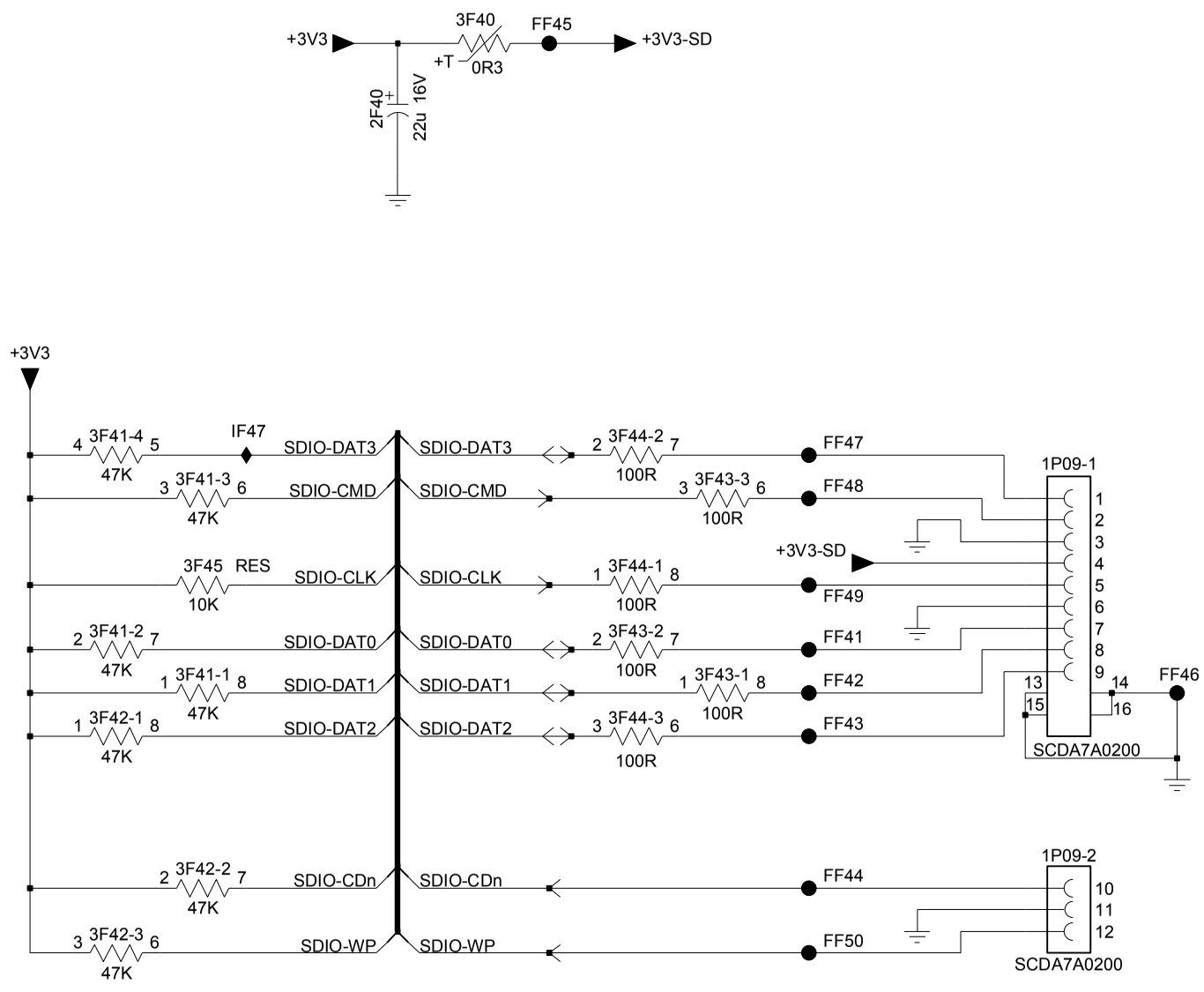
SD Card

B01D SD-Card

B01D



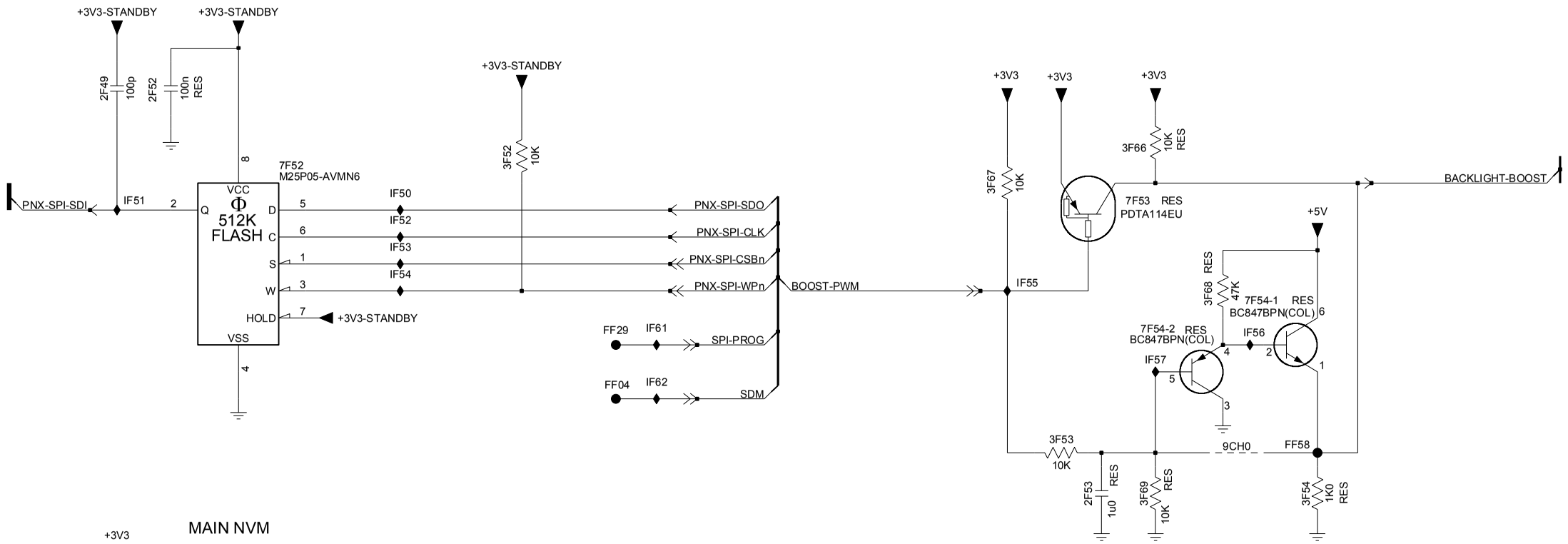
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_013_110411.eps
110415

PNX85500 Control

B01E PNX85500 Control

B01E



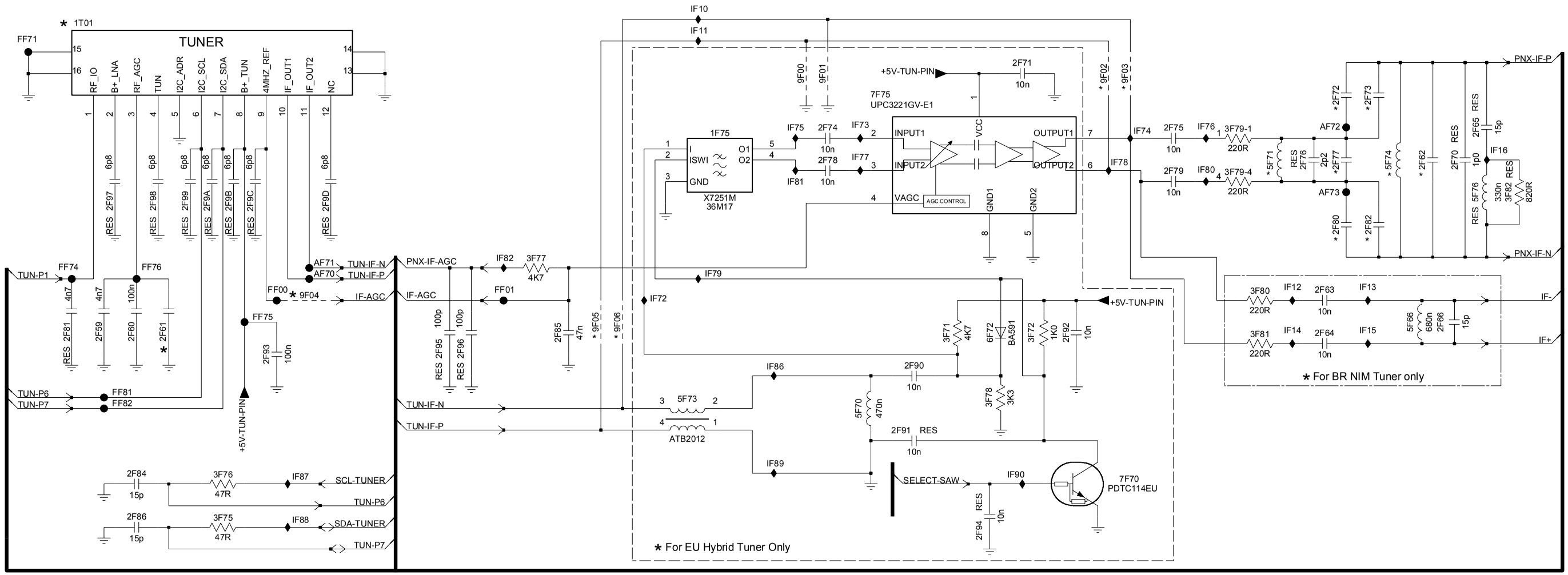
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

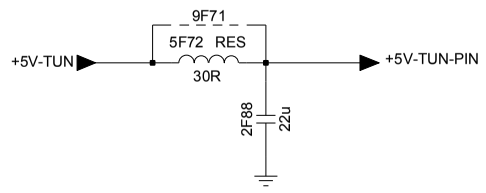
19110_014_110411.eps
110415

Tuner

B01F Tuner

B01F





* Remarks

Item No.	Component	
	Europe	Brazil
1T01	TH26X3	FA23X7
2F61	4u7	RES
2F62	10p	5p6
9F02	RES	Used
9F03	RES	Used
9F04	RES	Used
9F05	RES	Used
9F06	RES	Used
2F73	1p0	RES
2F82	1p0	RES
2F72	15p	12p
2F80	15p	12p
2F77	22p	18p
5F71	680n	560n
5F74	820n	680n

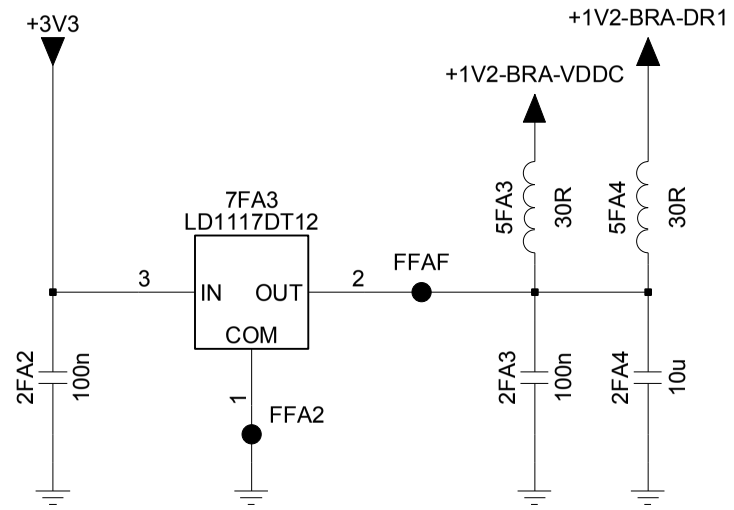
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_015_110415.eps
110415

Toshiba Supply

B01G Toshiba supply

B01G



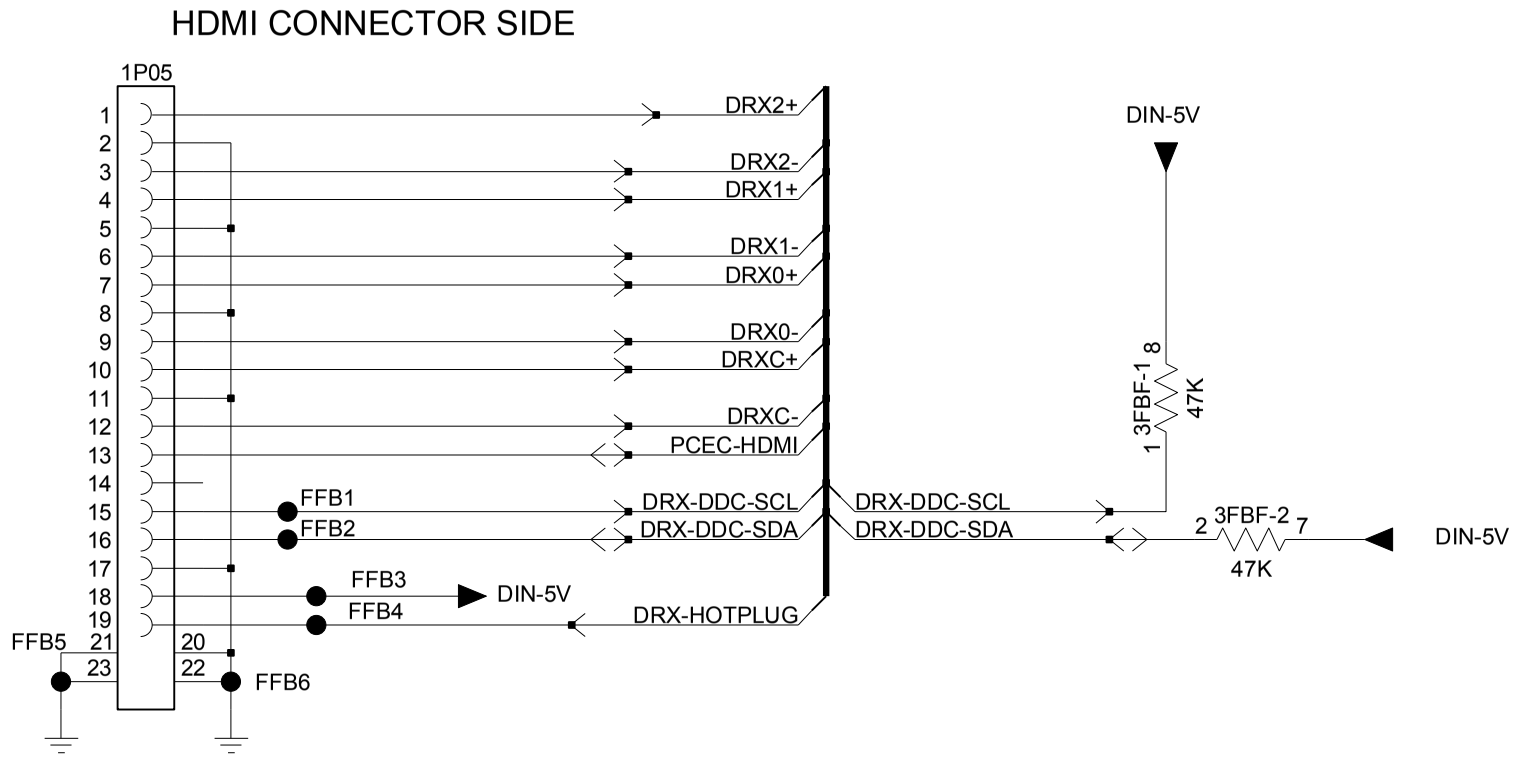
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_016_110415.eps
110415

HDMI

B01H HDMI

B01H



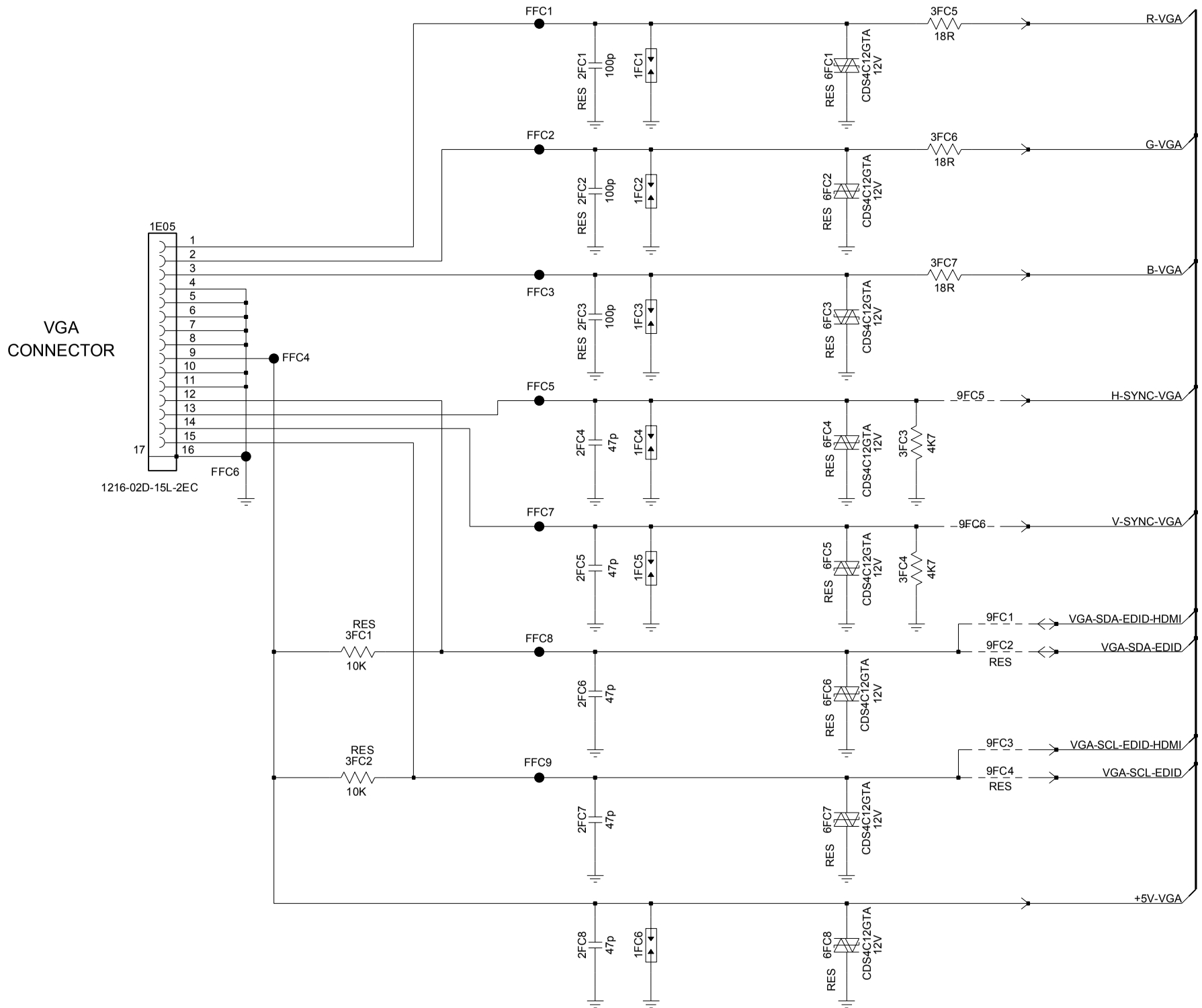
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_017_110415.eps
110415

VGA

B01I VGA

B01I



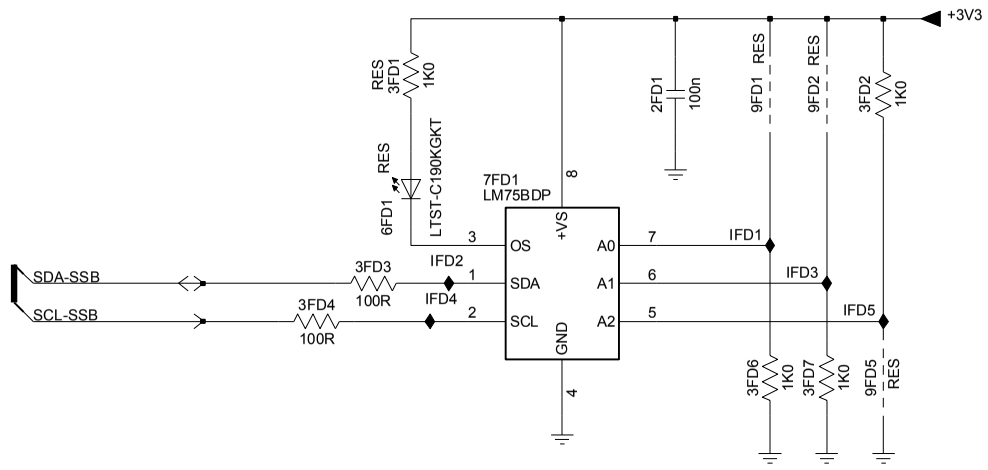
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

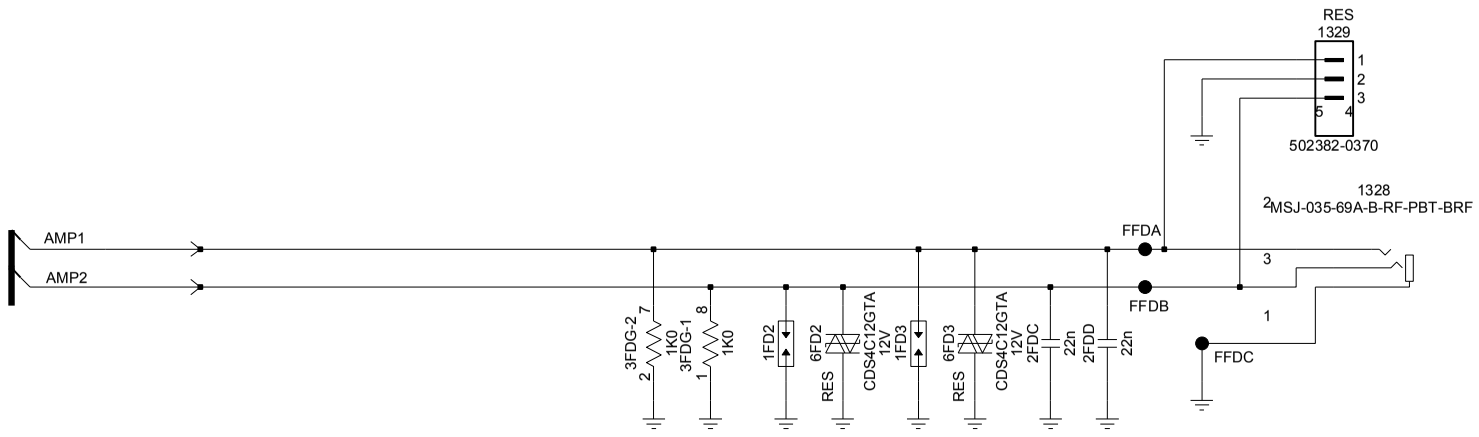
19110_018_110415.eps
110415

Temp sensor & headphone

B01J Temp sensor & headphone

B01J





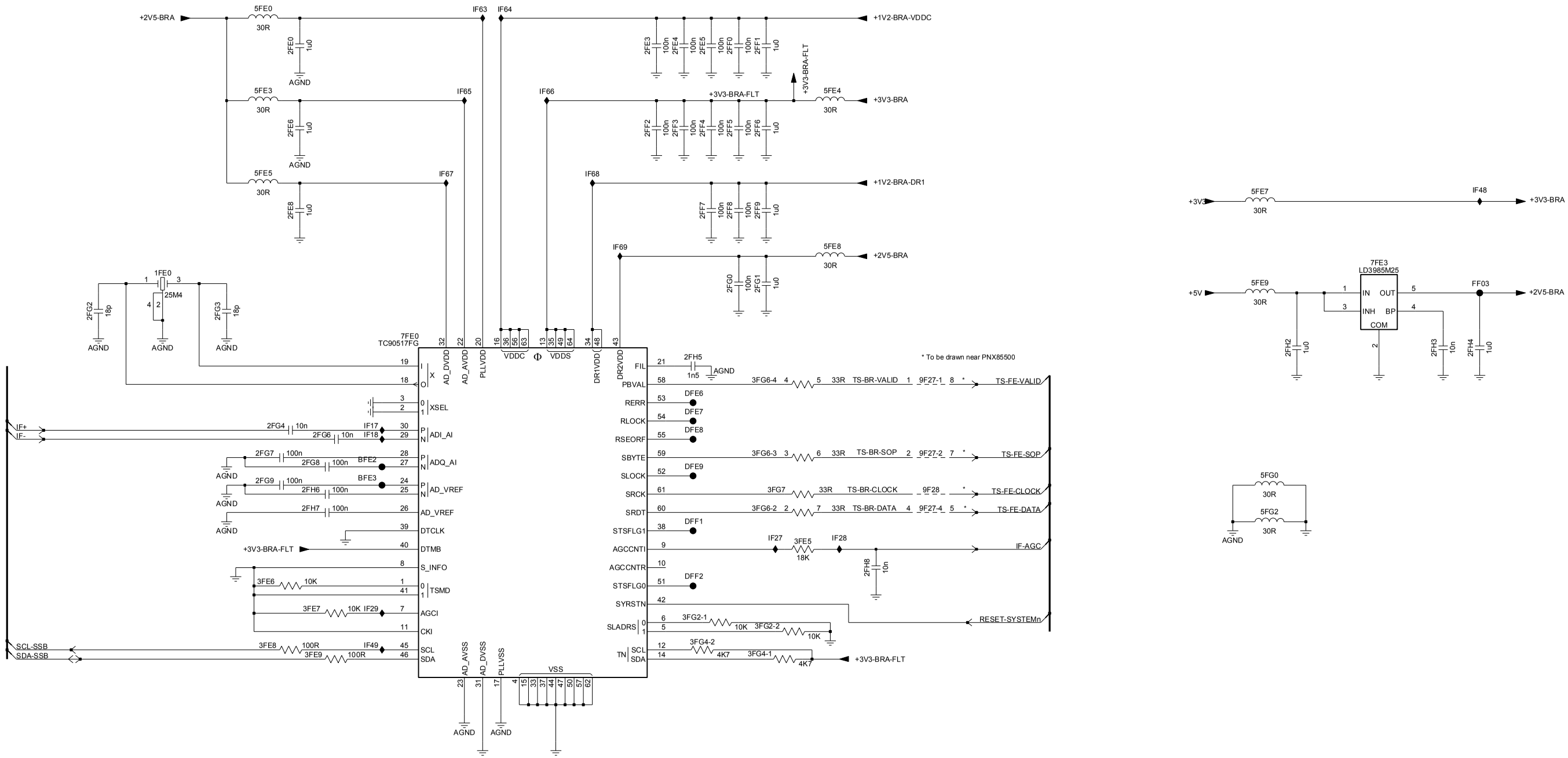
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_019_110415.eps
110415

Tuner Brazil

B01K Tuner Brazil

B01K

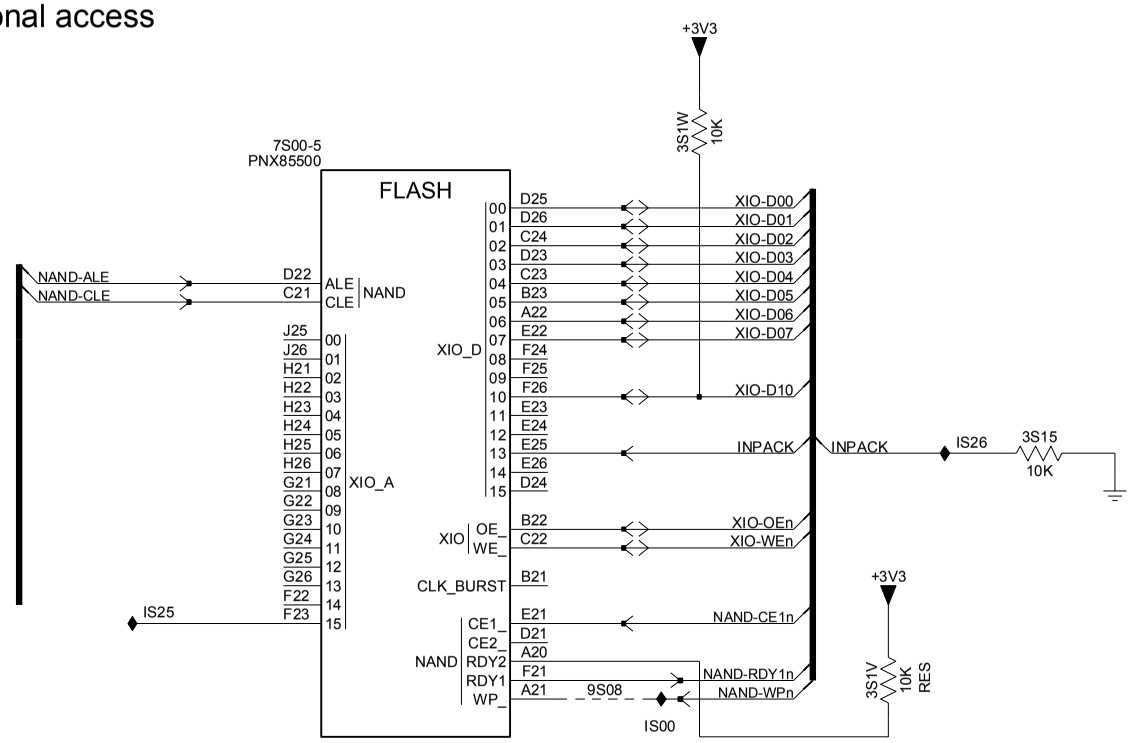


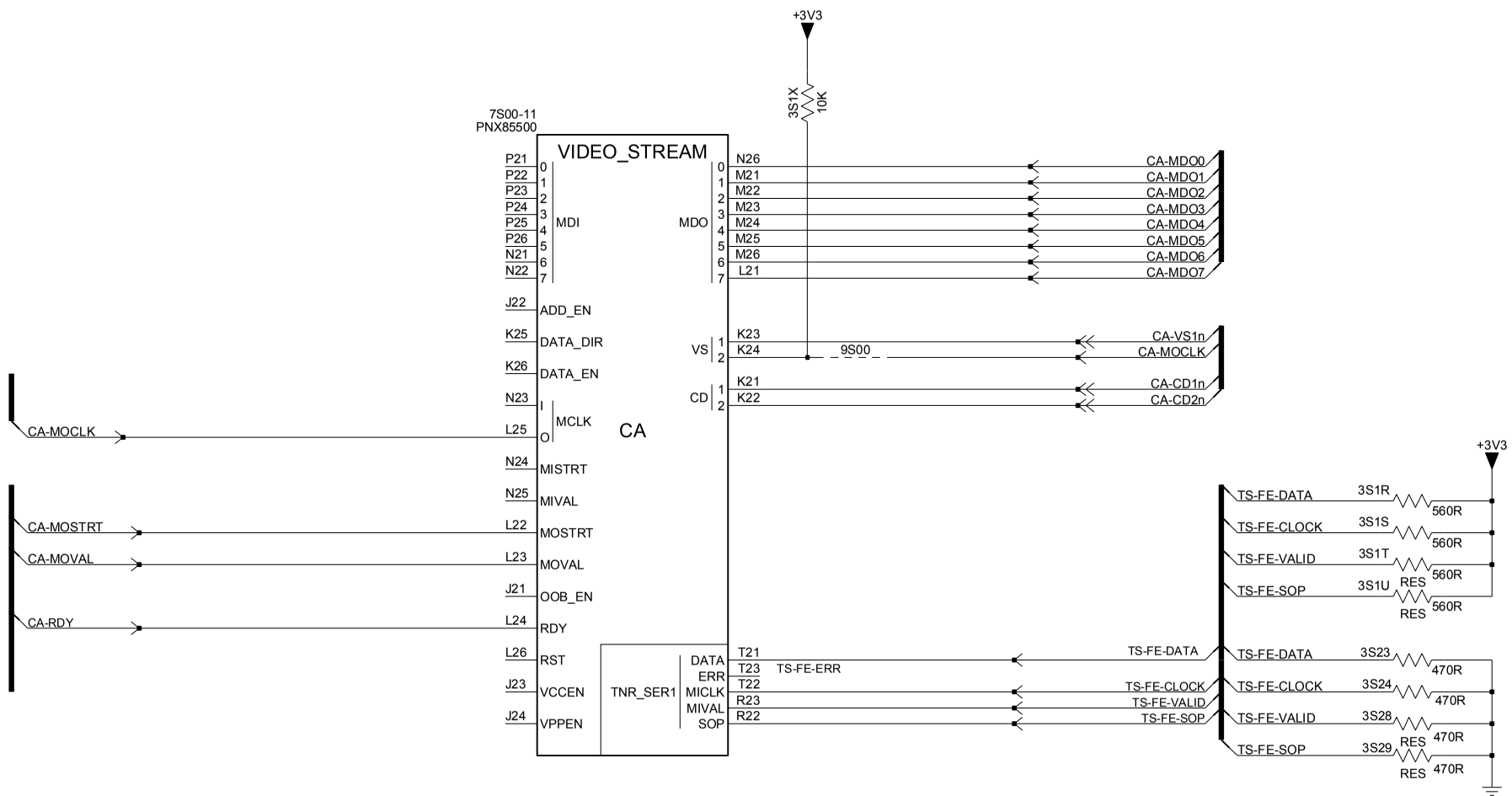
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_020_110415.eps
110415

10-2 B02 393912365213
NANDflash - conditional access

B02A PNX85500: NANDflash - conditional access **B02A**





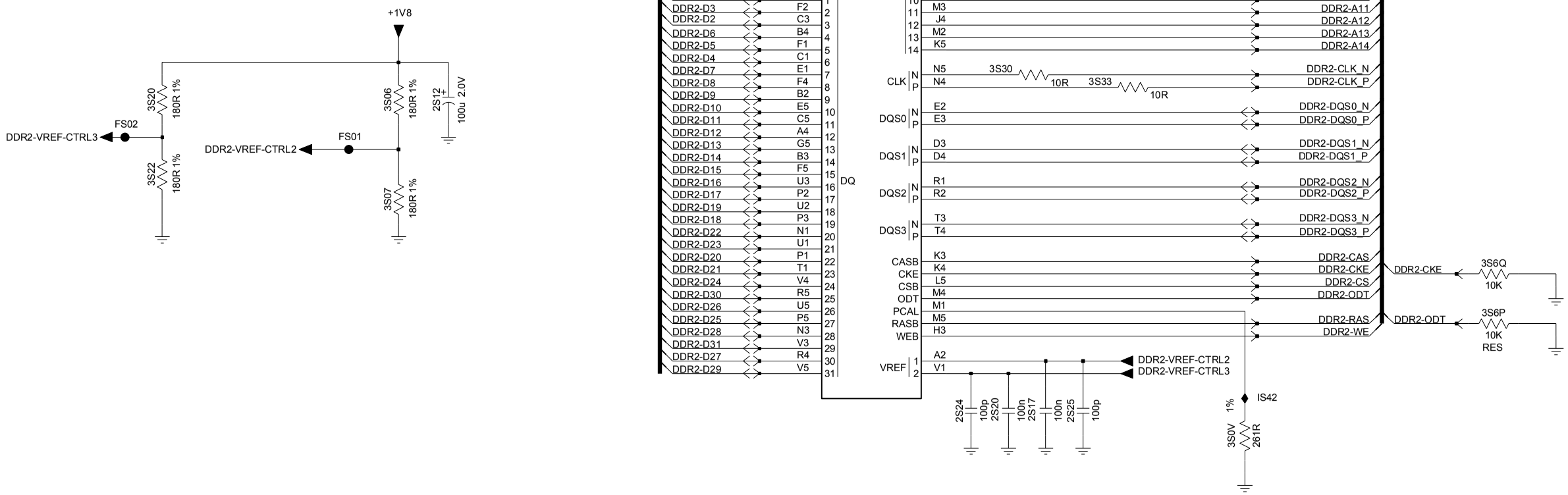
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_021_110415.eps
110415

SDRAM

B02B PNX85500: SDRAM

B02B



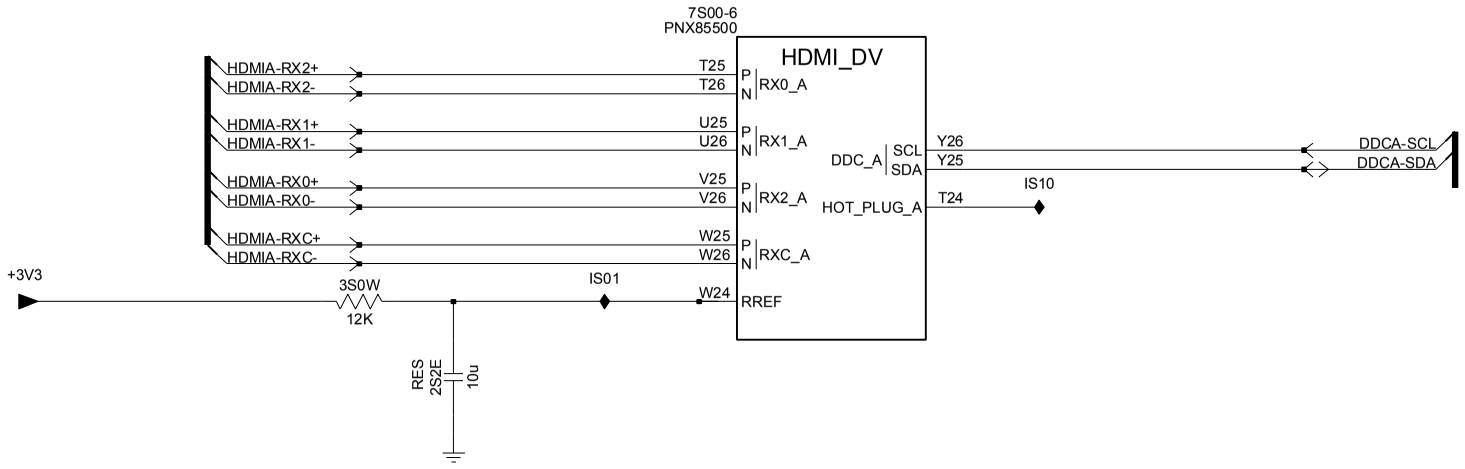
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_022_110415.eps
110415

Digital video in

B02C PNX85500: Digital video in

B02C



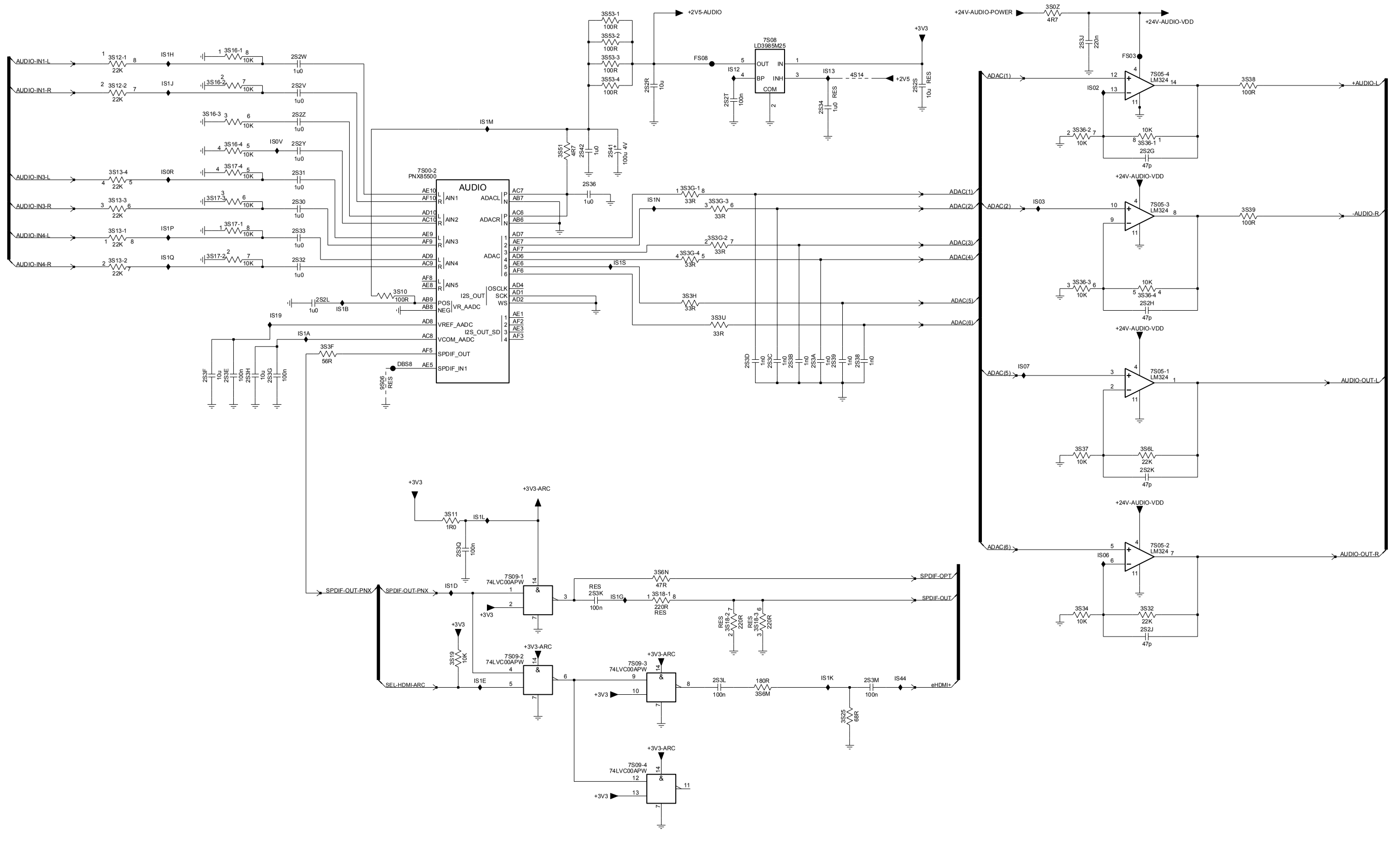
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_023_110415.eps
110415

Audio

B02D PNX85500: Audio

B02D



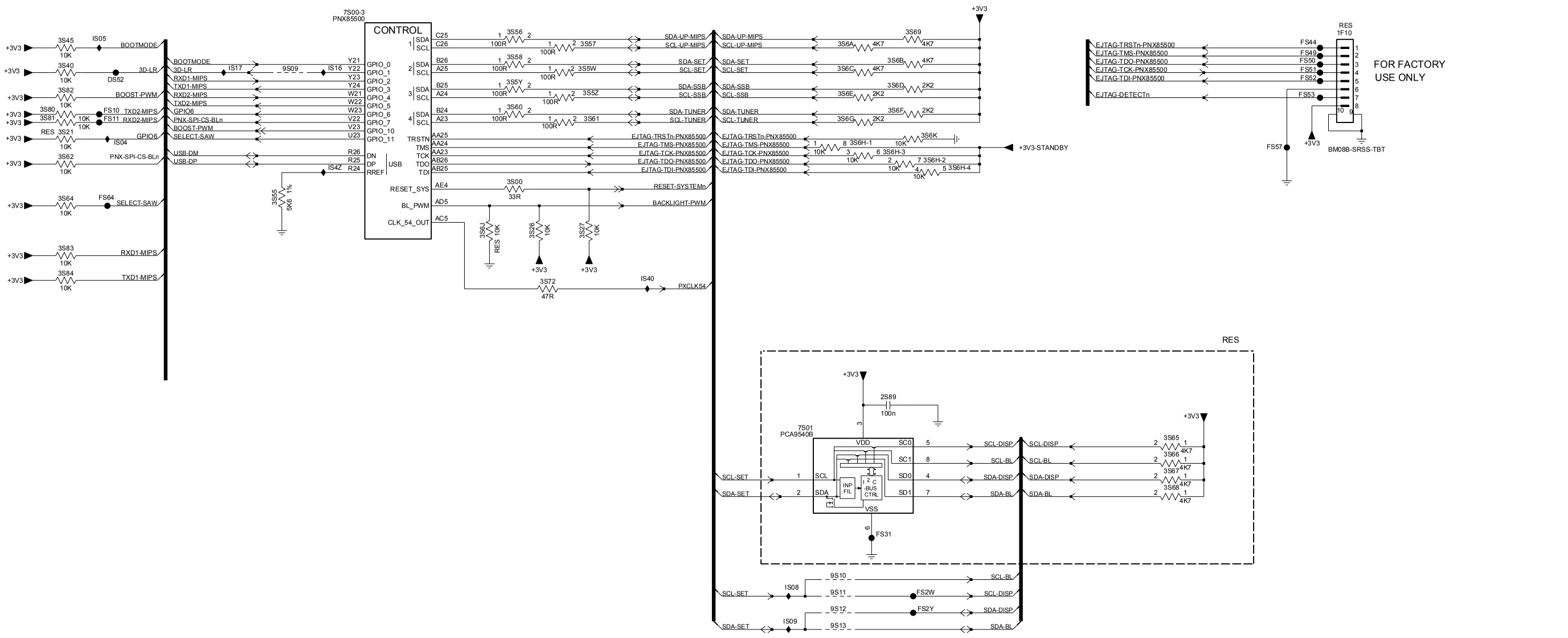
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

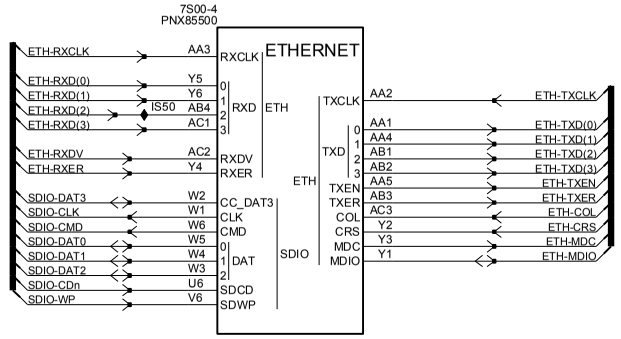
19110_024_110415.eps
110415

MIPS

B02E PNX85500: MIPS

B02E





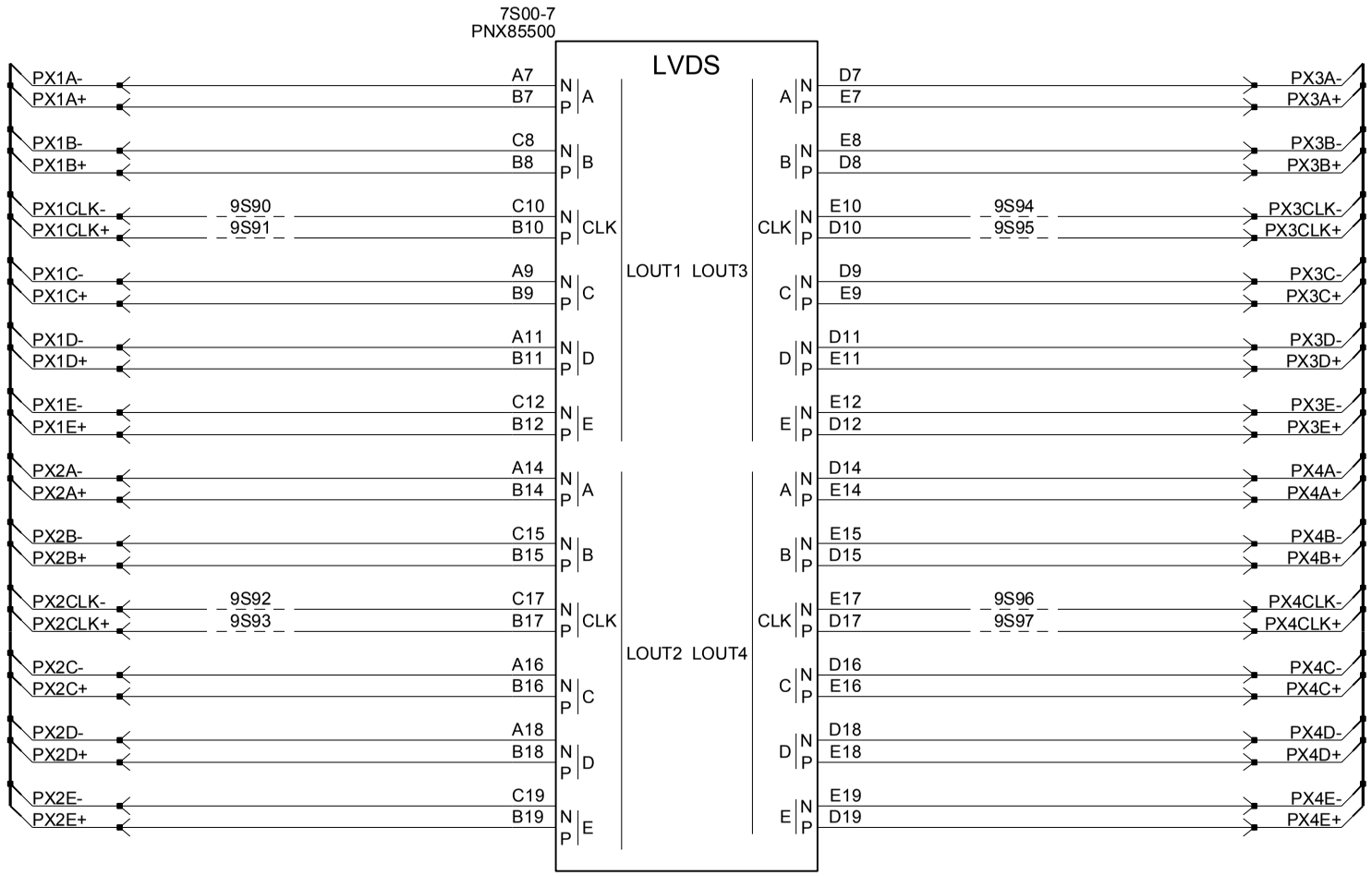
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_025_110415.eps
110415

Video out - LVDS

B02F PNX85500: Video out - LVDS

B02F



SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521

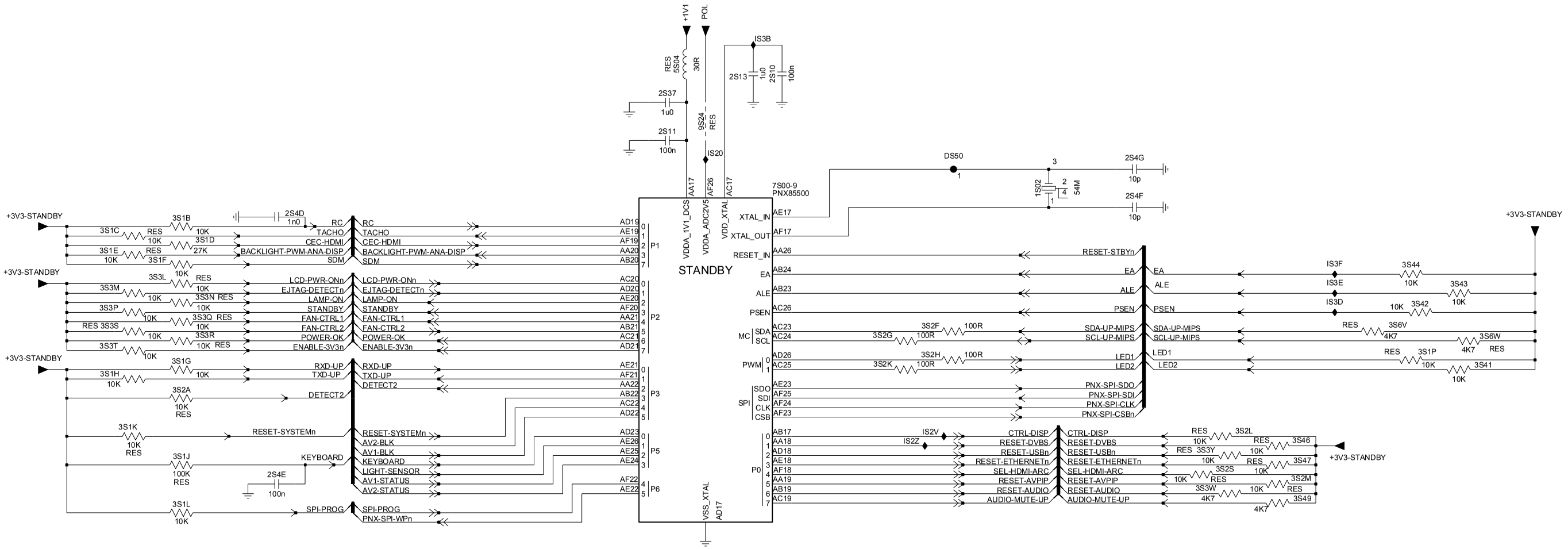
3	2011-03-09
2	2010-12-23

19110_026_110415.eps
110415

Standby controller

B02G PNX85500: Standby controller

B02G



SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521

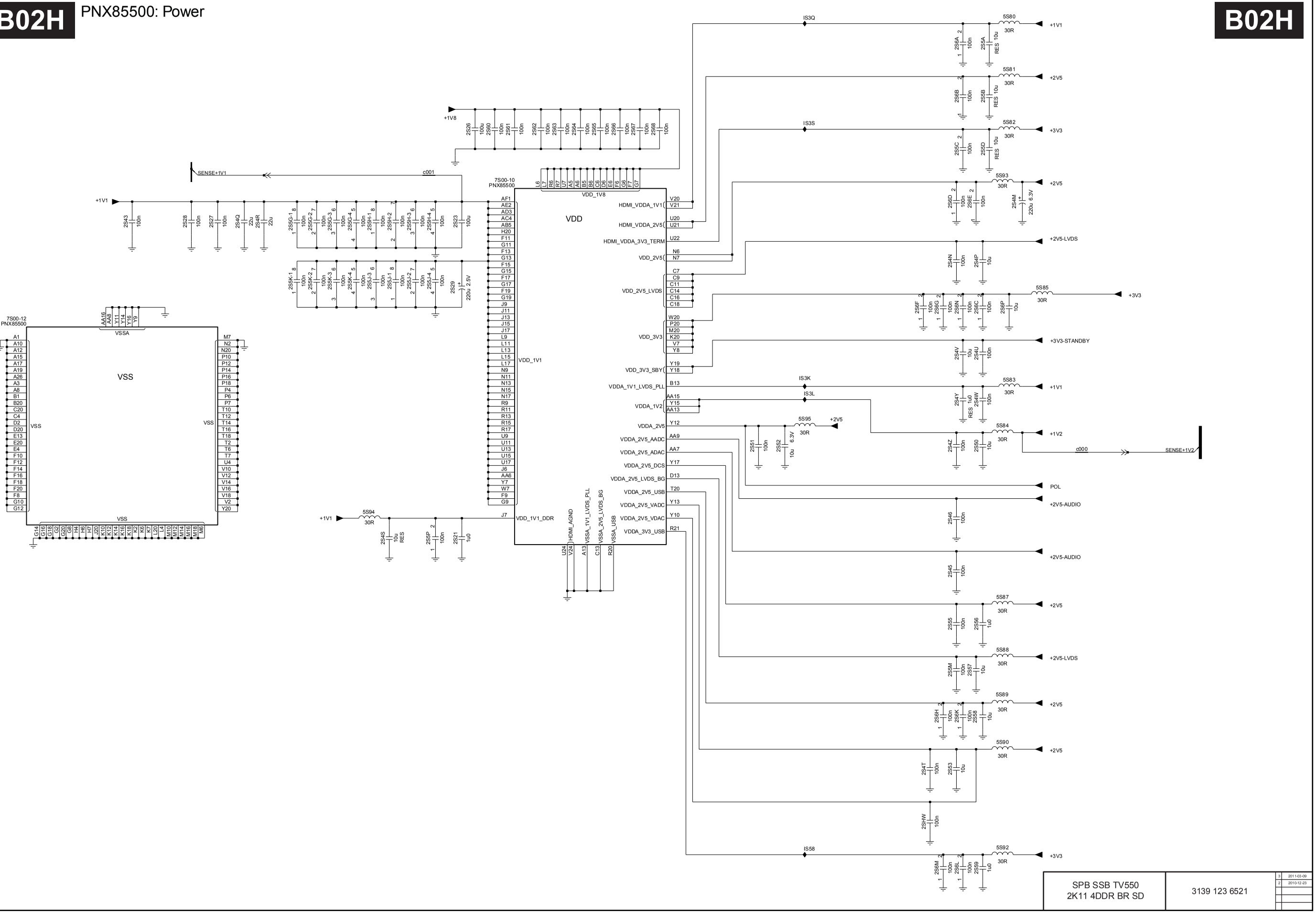
4	2011-03-09
2	2010-12-23

19110_027_110415.eps
110415

Power

B02H PNX85500: Power

B02H



19110_028_110415.eps
110415

Analog video

B02I PNX85500: Analog video

B02I

Connectivity

EU: SCART1
AP: -

EU: YPBPR1
AP: YPBPR1

EU: SCART2
AP: YPBPR2
+CVBS

EU: VGA
AP: VGA

AV1-CVBS, AV1-R, AV1-B, AV1-G, YPBPR1-SYNCIN1, AV3-Y, AV3-PR, AV3-PB, AV2-CVBS, AV4-Y, AV4-PR, AV4-PB, R-VGA, G-VGA, B-VGA, H-SYNC-VGA, V-SYNC-VGA, VGA-SCL-EDID, VGA-SDA-EDID

7S00-1 PNX85500 ANALOG_VIDEO

CVBS_MON-OUT1, PNX-IF-AGC, PNX-RF-AGC, PNX-IF-P, PNX-IF-N

IS4V, IS4W, IS5C, IS5D, IS5E, IS5F, IS5H, IS5J, IS11, BS10, BS13, BS15

* 319803104790 - RST SM0402 47R PMS Col R at 9S18 for BRZ

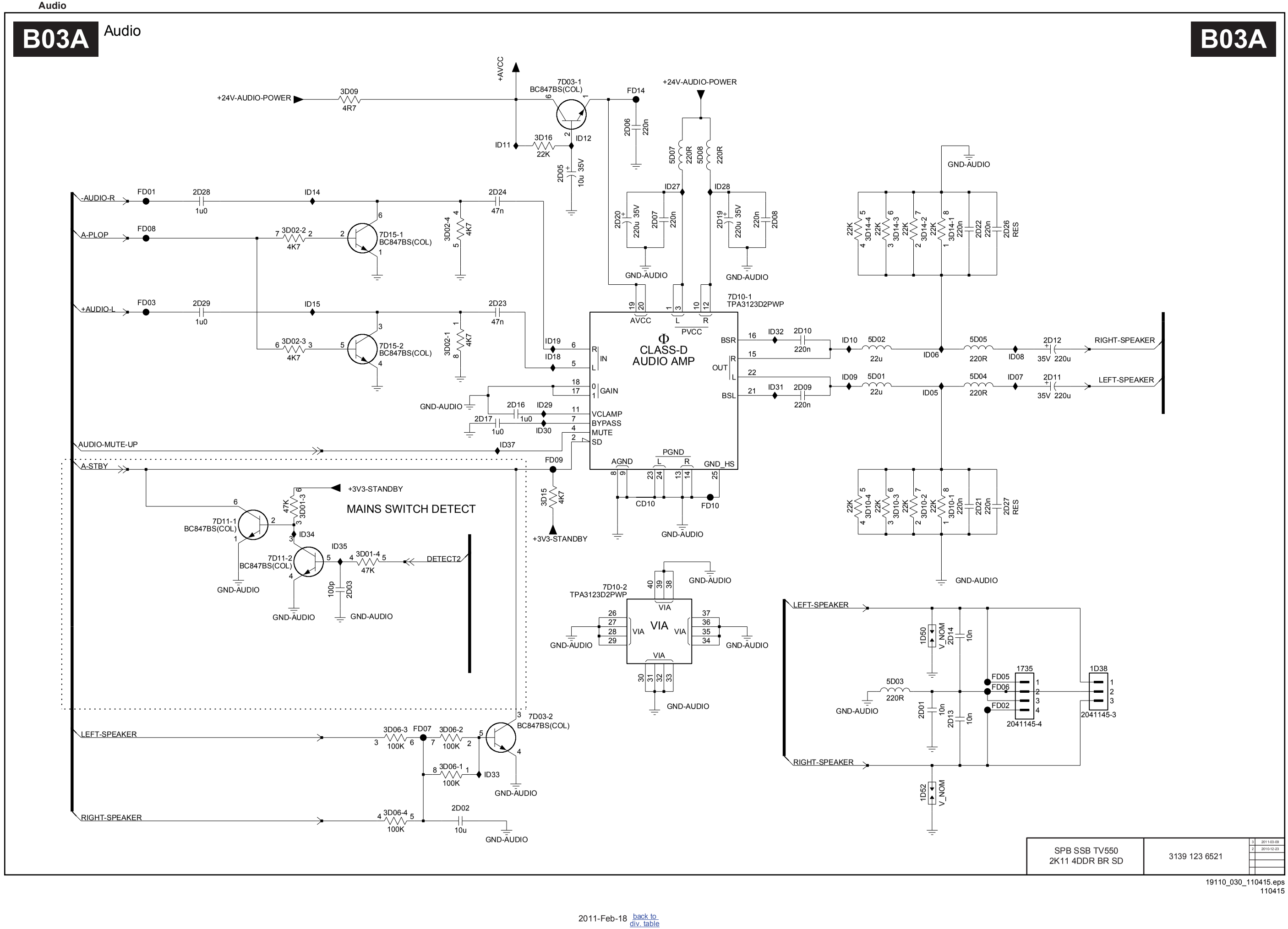
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521

3	2011-03-09
2	2010-12-23

19110_029_110415.eps
110415

10-3 B03 393912365213
Audio

B03A Audio

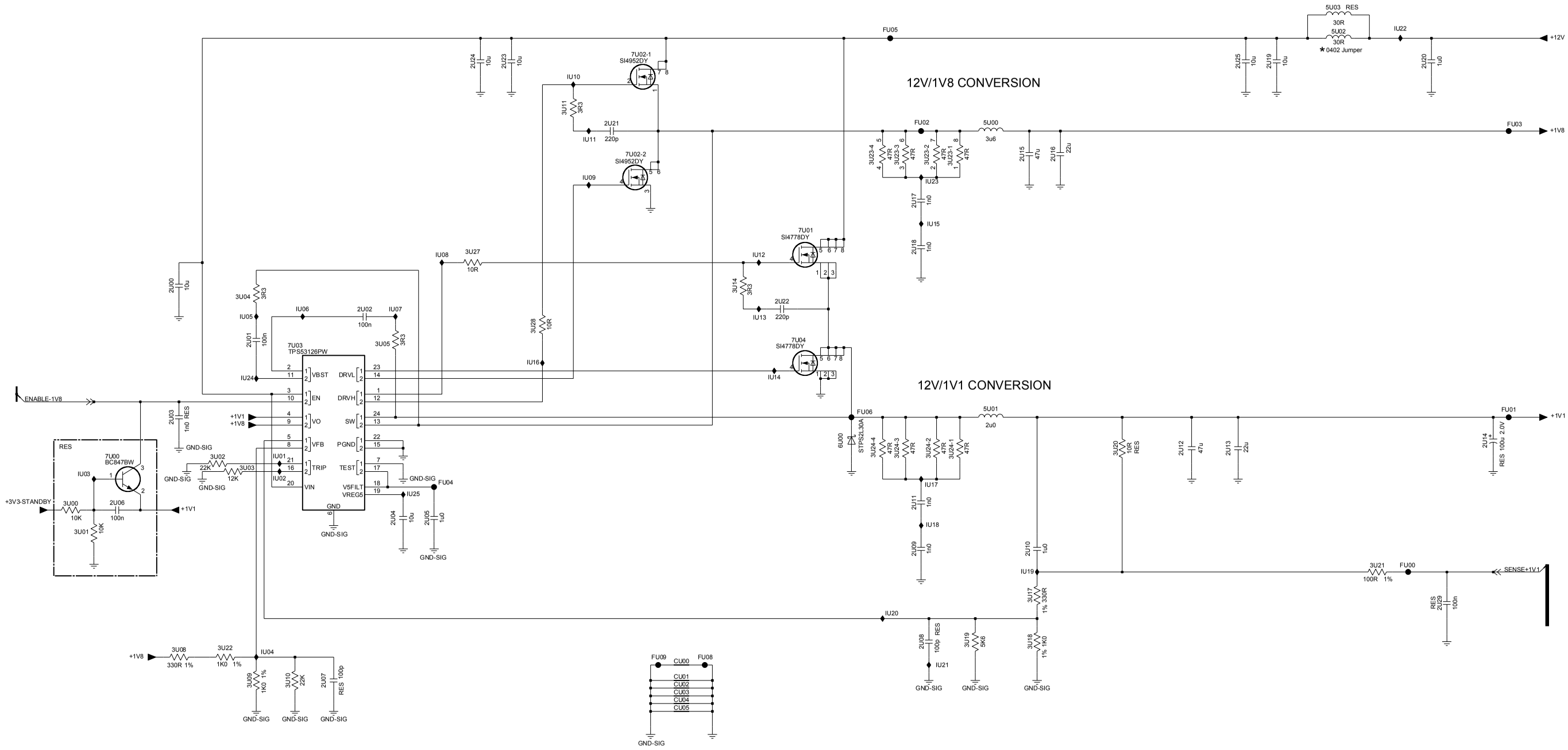


19110_030_110415.eps
110415

DC/DC

B03B DC/DC

B03B



SPB SSB TV550 2K11 4DDR BR SD	3139 123 65213	3 2011-03-09 2 2010-12-23

19110_031_110415.eps
110415

DC/DC

B03C DC/DC

B03C

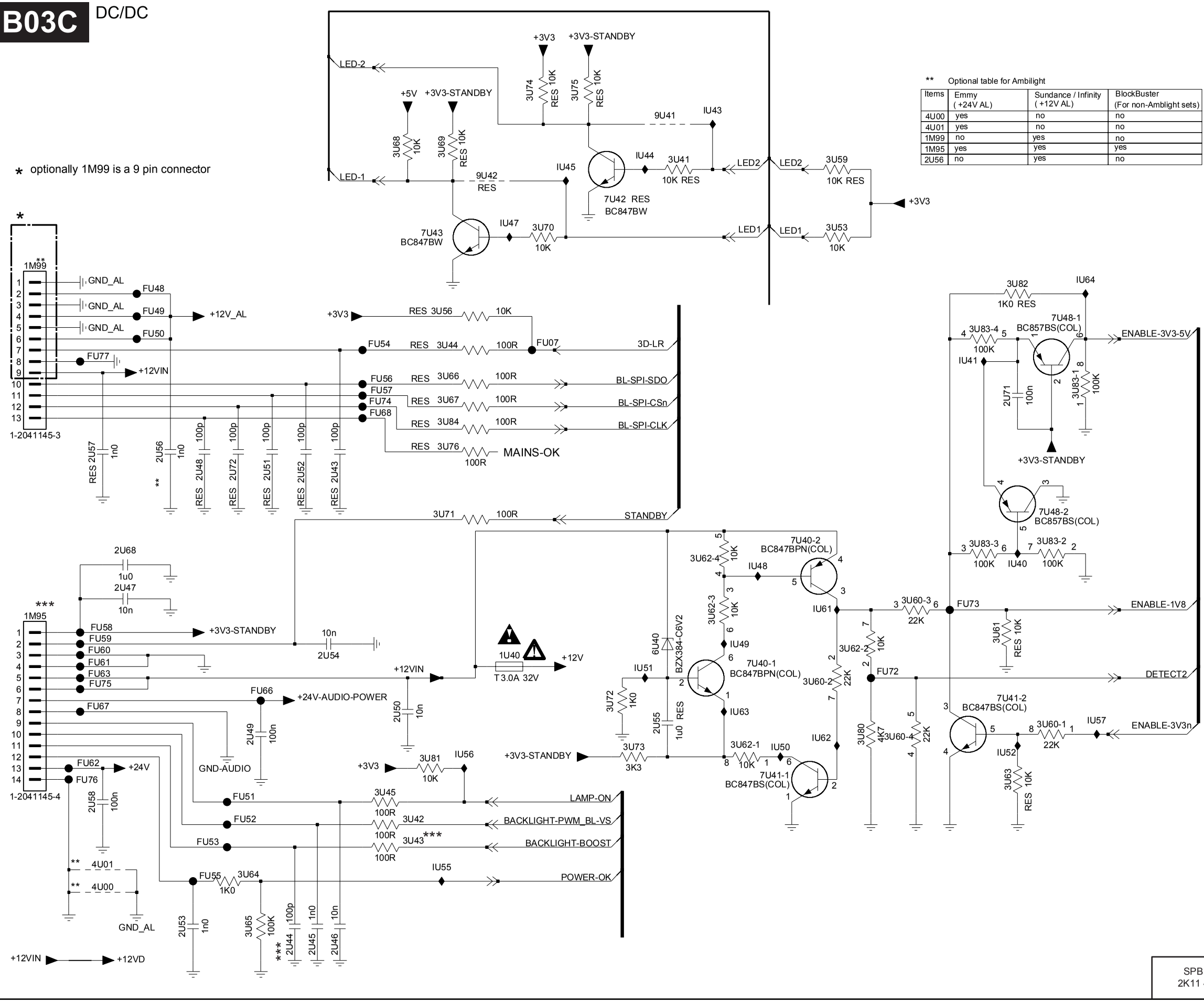
* optionally 1M99 is a 9 pin connector

** Optional table for Ambilight

Items	Emmy (+24V AL)	Sundance / Infinity (+12V AL)	BlockBuster (For non-Amblight sets)
4U00	yes	no	no
4U01	yes	no	no
1M99	no	yes	no
1M95	yes	yes	yes
2U56	no	yes	no

*** Optional table for Styling

	2U44	3U43	1M95
Dream Catcher	0R	open	13 POLE
Core Range	100p	100R	14 POLE



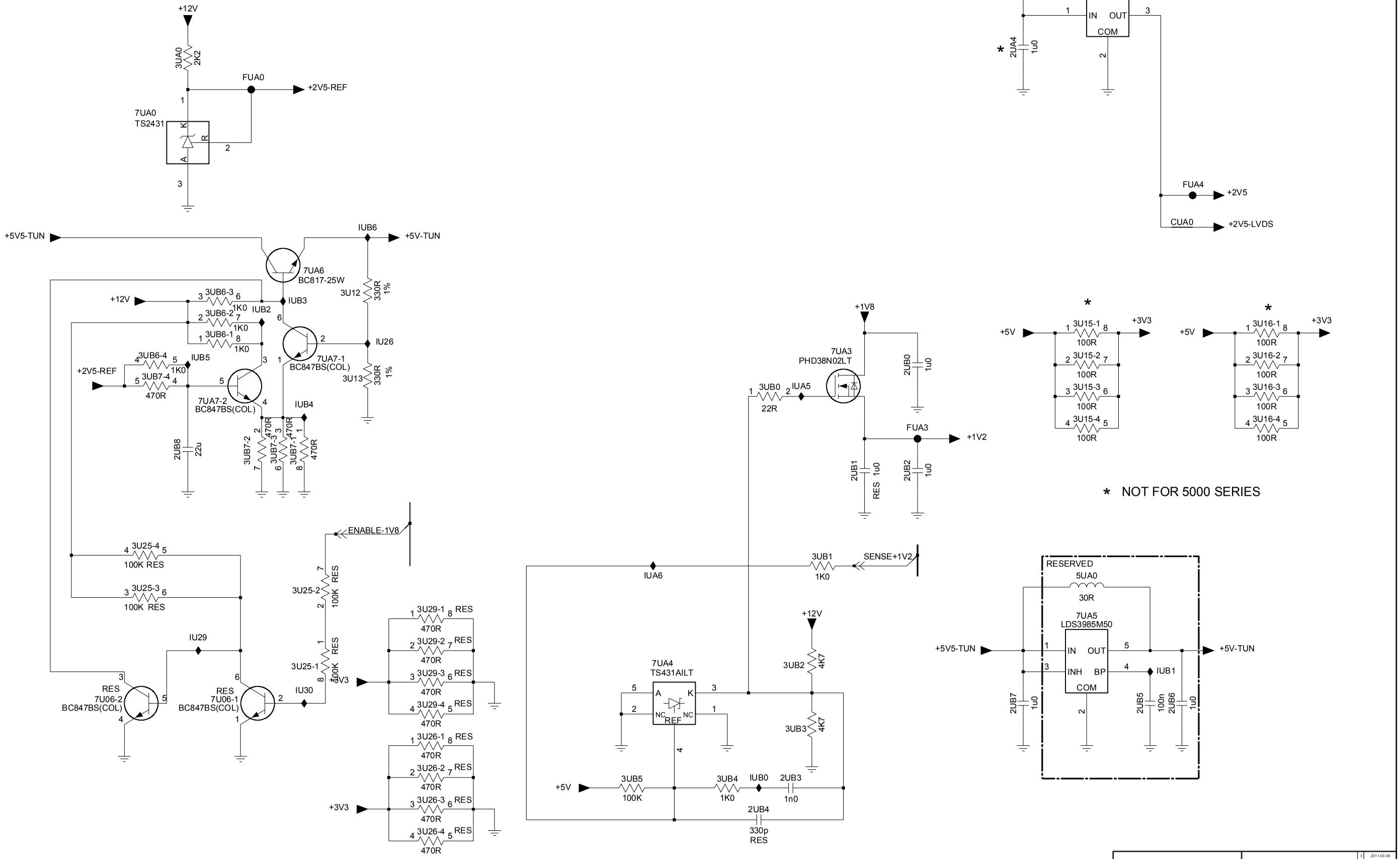
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_032_110415.eps
110415

DC/DC

B03D DC/DC

B03D



SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521

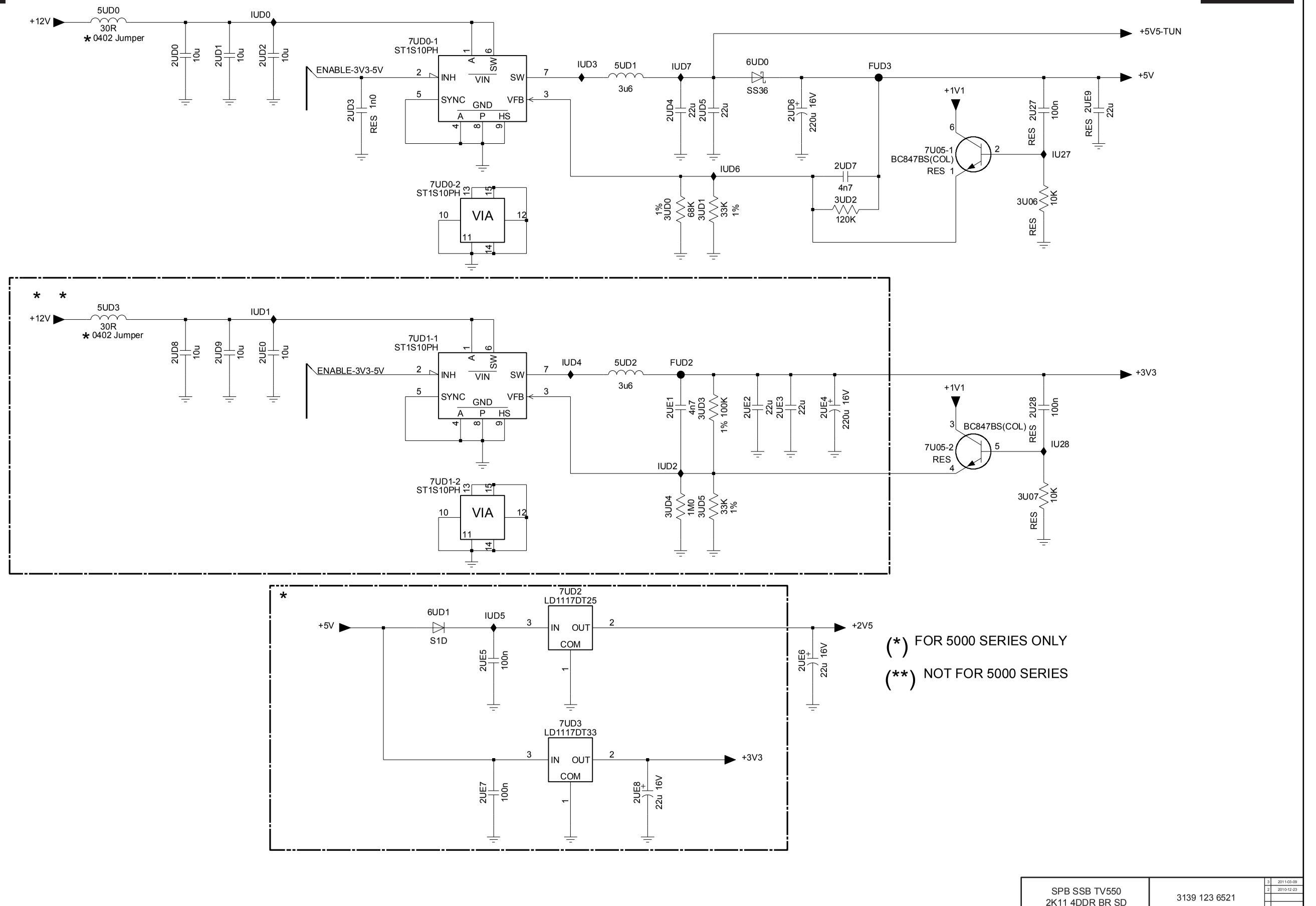
3	2011-03-09
2	2010-12-23

19110_033_110415.eps
110415

DC/DC

B03E DC/DC

B03E



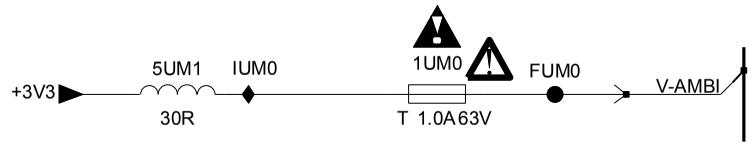
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_034_110415.eps
110415

Temperature sensor & AmbiLight

B03F Temperature sensor & AmbiLight

B03F



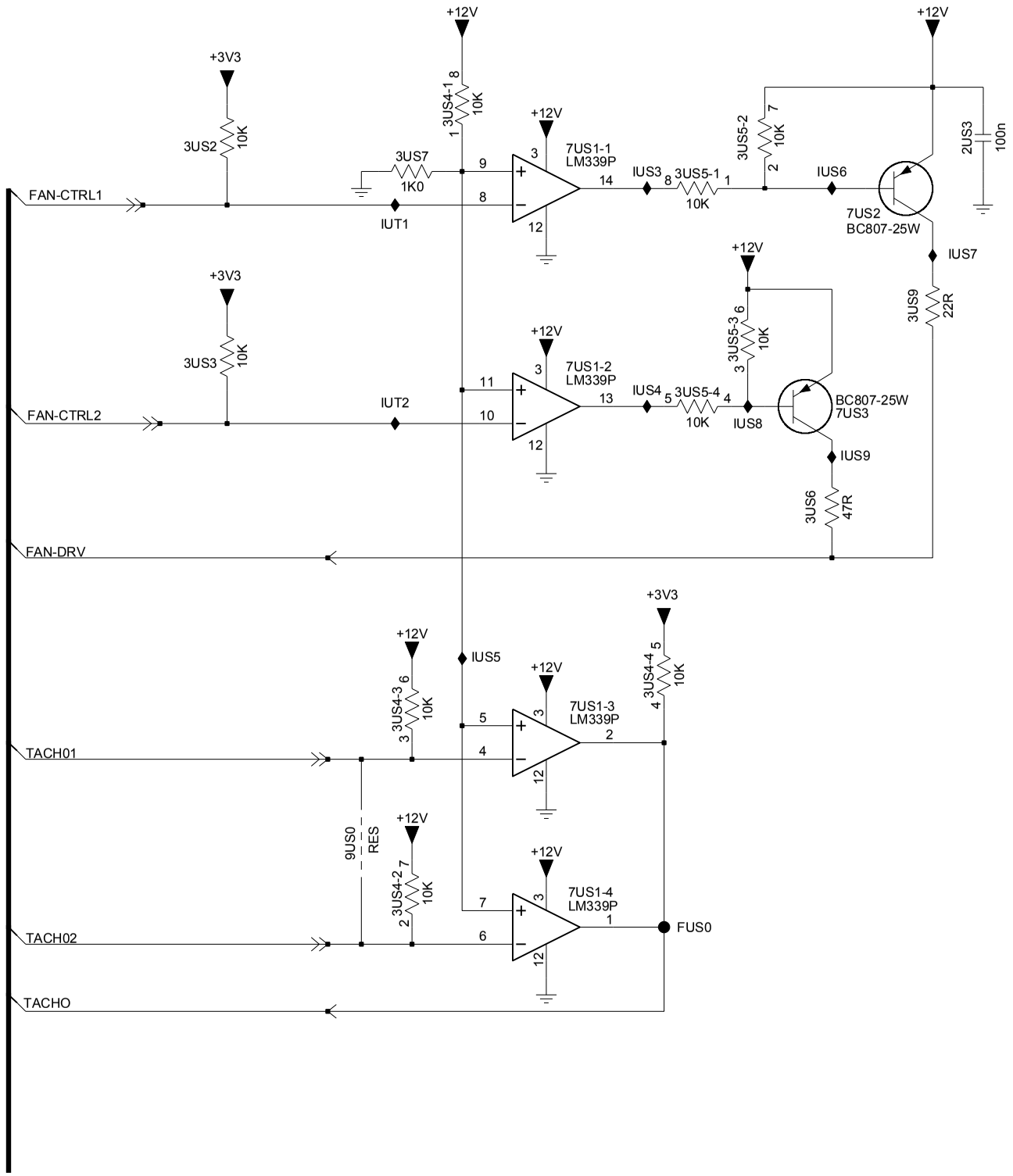
SPB SSB TV550 2K11 4DDR BR SD	3139 123 65213	3 2011-03-09 2 2010-12-23

19110_035_110415.eps
110415

Fan control

B03G Fan control

B03G



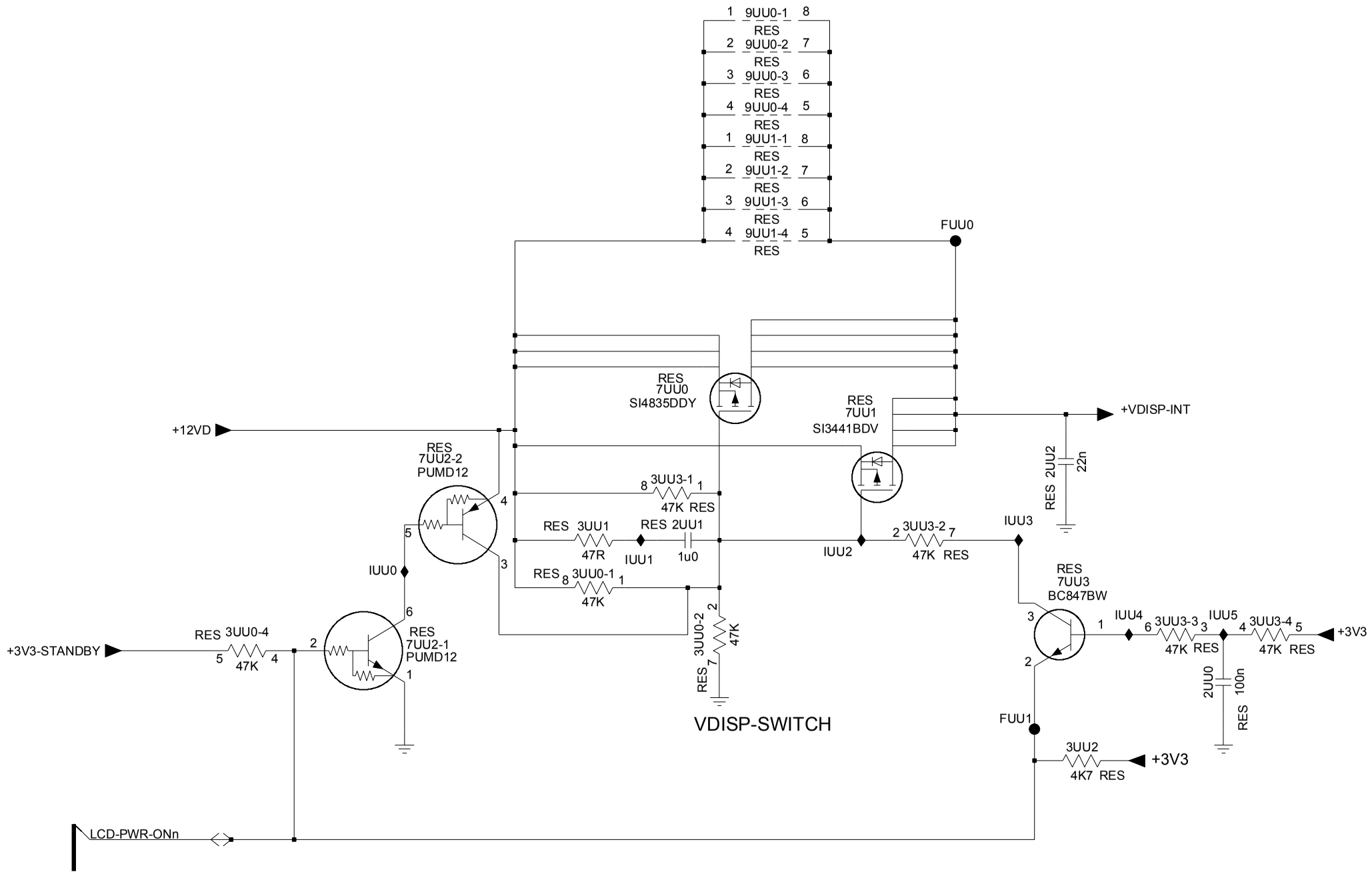
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_035_110415.eps
110415

Vdisp switch

B03H Vdisp switch

B03H



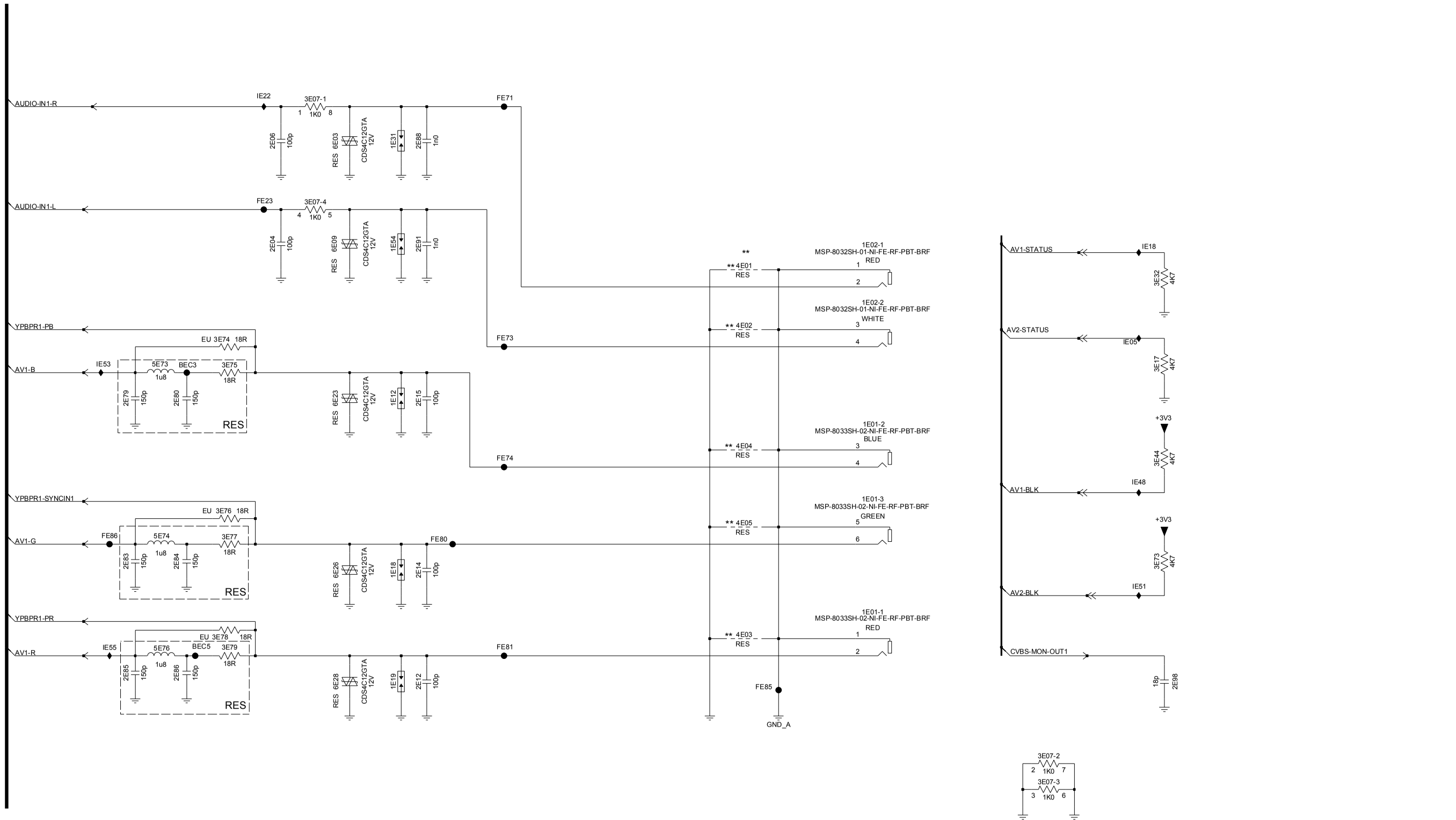
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_037_110415.eps
110415

10-4 B04 393912365213
Analogue externals A

B04A Analogue externals A

B04A



SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_038_110415.eps
110415

B04B Analogue externals B

B04B

YPBPR

MSP-8033SH-05-NI-FE-RF-PBT-BRF

1E08-1 * 2 1 YELLOW

** 4E20 RES

GND_A

100p 2E27 1E43

RES 6E40 CDS4C12GTA 12V

FE54 EU 9E29 IE71 3E87 18R FE72 AV3-Y

YPBPR1-SYNCIN1

AP 9E04 3E88 27R IE73 AV2-CVBS

MTJ-032-21B-45 NI FE (PBT)

1E03 2 1

** 4E21 RES

GND_A

100p 2E67 1E28

RES 6E51 CDS4C12GTA 12V

FE51 EU 9E57 IE74 3E89 18R IE75 AV3-PB

YPBPR1-PB

MTJ-032-21B-42 NI FE

1E04 2 1

** 4E22 RES FE42

GND_A

100p 2E68 1E39

RES 6E52 CDS4C12GTA 12V

FE48 EU 9E58 IE76 3E90 18R IE77 AV3-PR

YPBPR1-PR

SPDIF out

SPDIF-OUT IE15 RES 5E06 30R FE59

RES 2E22 10p 1E34

RES 6E46 CDS4C12GTA 12V

RES 1E07 MTJ-032-68B-46-NI-FE 1 2 FE41

YPBPR AUDIO

MSP-8033SH-05-NI-FE-RF-PBT-BRF

* 1E08-3 6 5 RED

** 4E23 RES FE43

GND_A

1n0 2E39 1E29

RES 6E06 CDS4C12GTA 12V

FE50 3E97 1K0 IE31 AUDIO-IN3-R

100p 2E72

MSP-8033SH-05-NI-FE-RF-PBT-BRF

* 1E08-2 4 3 WHITE

RES ** 4E24

GND_A

1n0 2E40 1E42

RES 6E38 CDS4C12GTA 12V

FE49 3E96 1K0 IE29 AUDIO-IN3-L

100p 2E71

Provision for Dreamcatcher

+3V3

RES 1E32

AV3-Y 9E15 RES 1

AV1-CVBS 9E16 RES 2

3

AV3-PR 9E19 RES 5

RXD1-MIPS 9E12 RES 6

7

AV3-PB 9E17 RES 9

TXD1-MIPS 9E14 RES 10

11

AUDIO-IN3-R 9E11 RES 13

AV1-B 9E18 RES 14

15

16

AUDIO-IN3-L 9E13 RES 17

AV1-G 9E20 RES 18

19

20

21

AV1-R 9E22 RES 22

23

24

25

AV1-STATUS 9E24 RES 26

AUDIO-IN1-R 9E25 RES 27

AV1-BLK 9E26 RES 28

29

AUDIO-IN1-L 9E28 RES 30

32 31

DF50-30DP

VGA (OR DVI) AUDIO

1E09 MSJ-035-69A-B-RF-PBT-BRF 2 3 1

FE01

FE02 3E21 1K0 IE09 AUDIO-IN4-L

2E36 1n0 1E37 V_NOM

RES 6E19 CDS4C12GTA 12V

2E35 100p

FE03 3E20 1K0 IE10 AUDIO-IN4-R

2E37 1n0 1E38 V_NOM

RES 6E20 CDS4C12GTA 12V

2E38 100p

+3V3

3E9C 1K0

1E10 3150-831-030-H1

VCC 2

FE44

VIN 1

GND 3

MT 7 6 5 4

2E73 100n

RES 2E77 100p 1E80 V_NOM

RES 6E53 CDS4C12GTA 12V

SPDIF-OPT

* SOC Cinch V 3P 1L3 YEWHRDY at 1E08 for Brazil

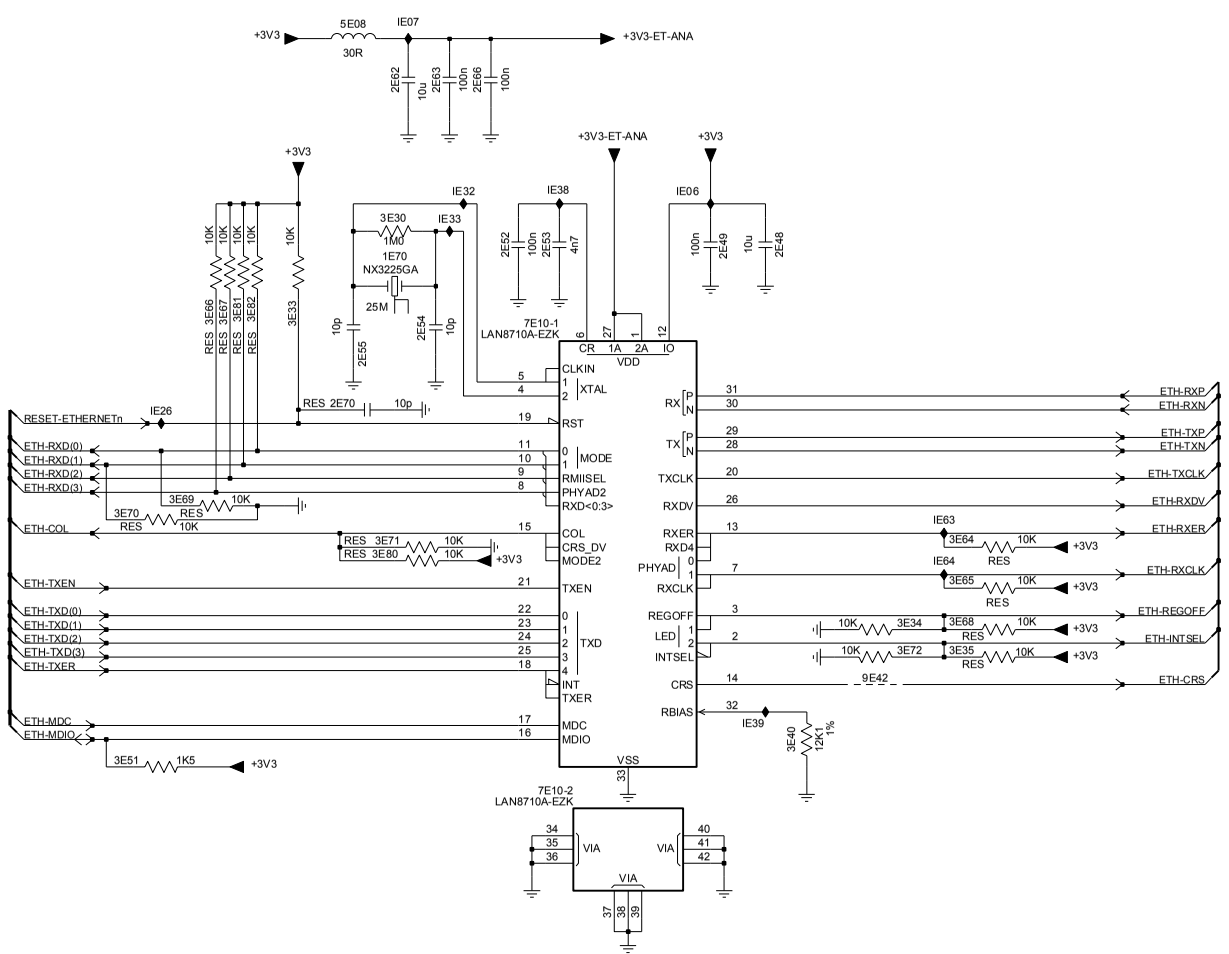
** Provision for ESD

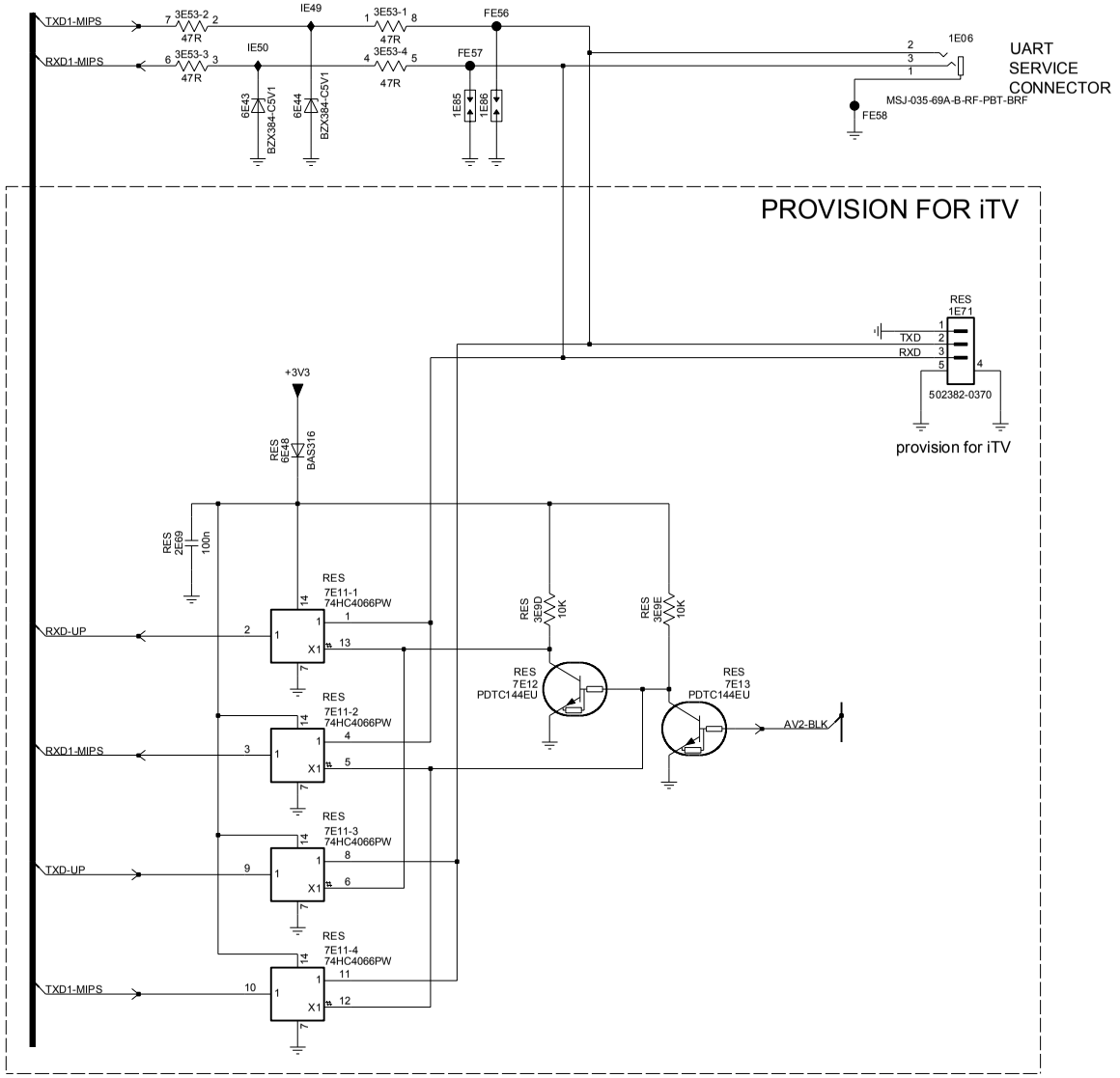
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

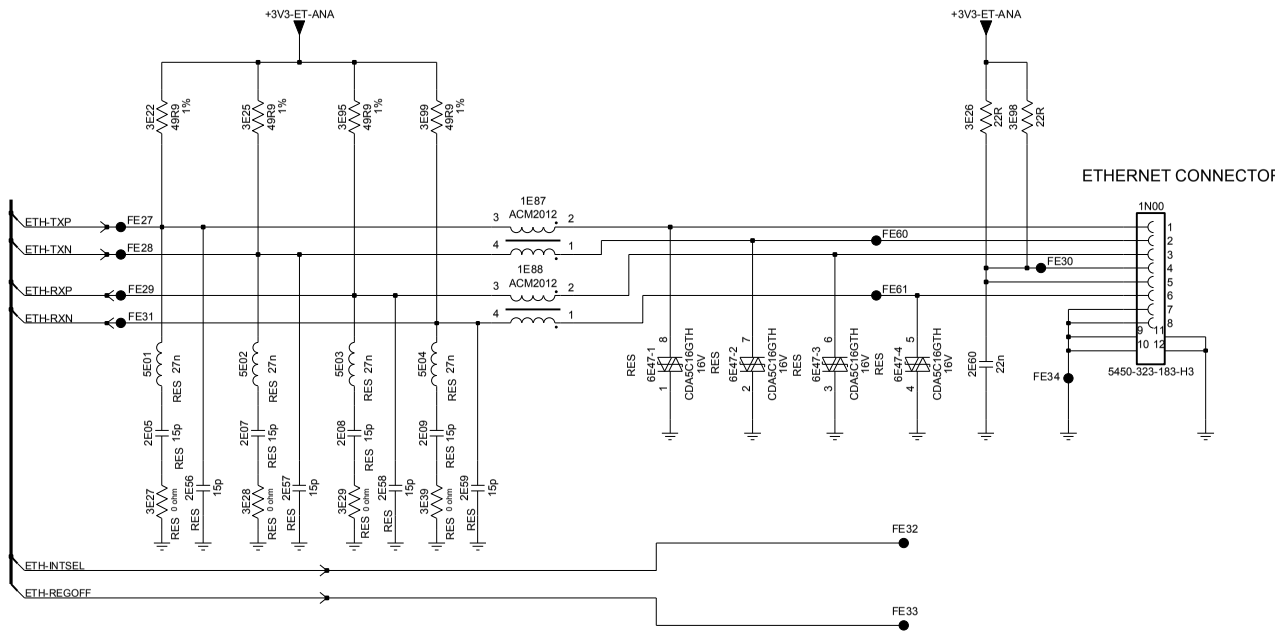
19110_039_110415.eps
110415

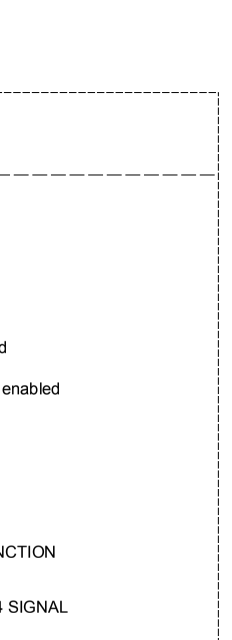
Ethernet & Service

B04C Ethernet & Service









ETHERNET CONNECTOR

CONFIGURATION RESISTOR SETTINGS

Resistor	POP	EMPTY
3E64 (RES)	PHYADD(0) = 1	PHYADD(0) = 0
3E65 (RES)	PHYADD(1) = 1	PHYADD(1) = 0
3E66 (RES)	PHYADD(2) = 1	PHYADD(2) = 0
3E67 (RES)	RMII mode selected	MII mode selected
3E68 (RES)	Internal 1.2V reg. disabled	Internal 1.2V reg. enabled
3E69 (RES)	MODE(0) = 0	MODE(0) = 1
3E70 (RES)	MODE(1) = 0	MODE(1) = 1
3E71 (RES)	MODE(2) = 0	MODE(2) = 1
3E72	INTERRUPT FUNCTION DISABLED ON nINT/TXER/TXD4 SIGNAL	INTERRUPT FUNCTION ENABLED ON nINT/TXER/TXD4 SIGNAL

SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

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110415

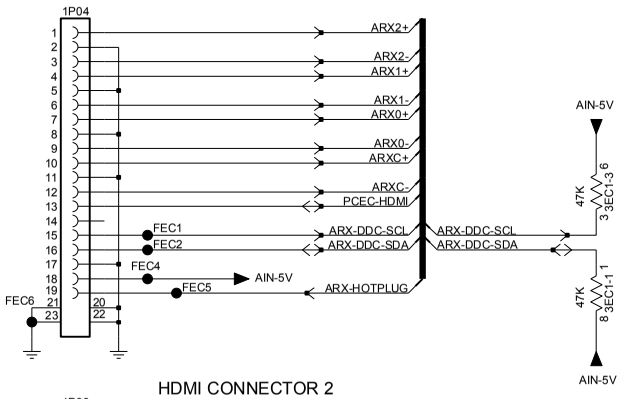
HDMI

B04D HDMI

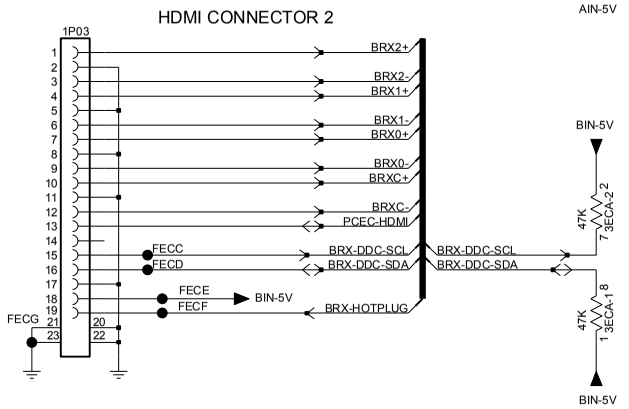
B04D

I2C Address
SII9187B = 0xB2

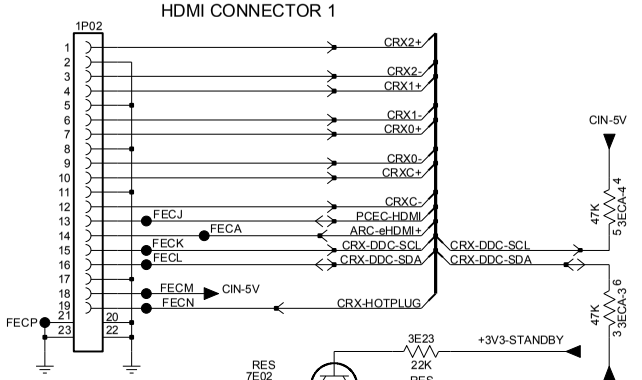
HDMI CONNECTOR 3

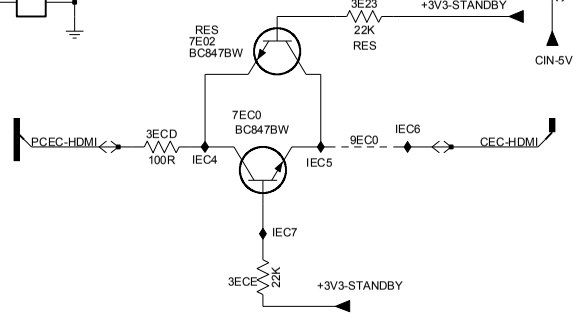


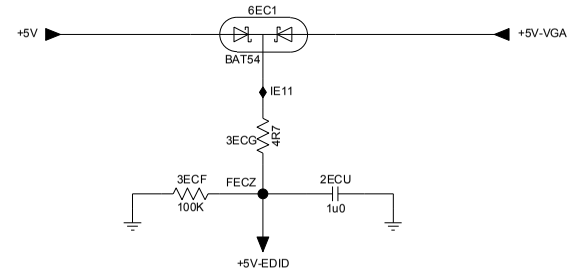
HDMI CONNECTOR 2

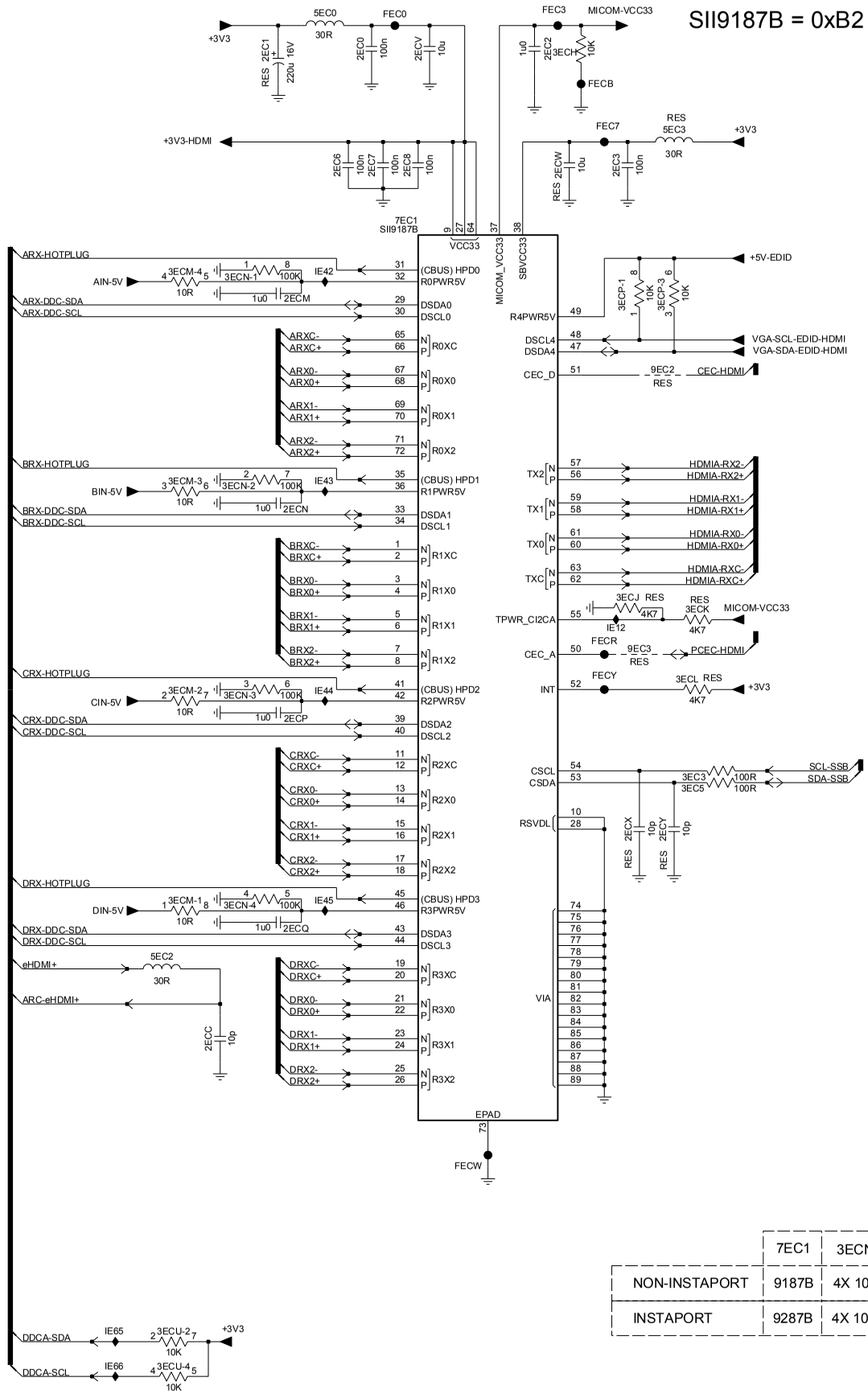


HDMI CONNECTOR 1









	7EC1	3ECN	3ECF	
NON-INSTAPORT	9187B	4X 100K	100K	BLOCKBUSTER
INSTAPORT	9287B	4X 100K	100K	SUNDANCE

SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

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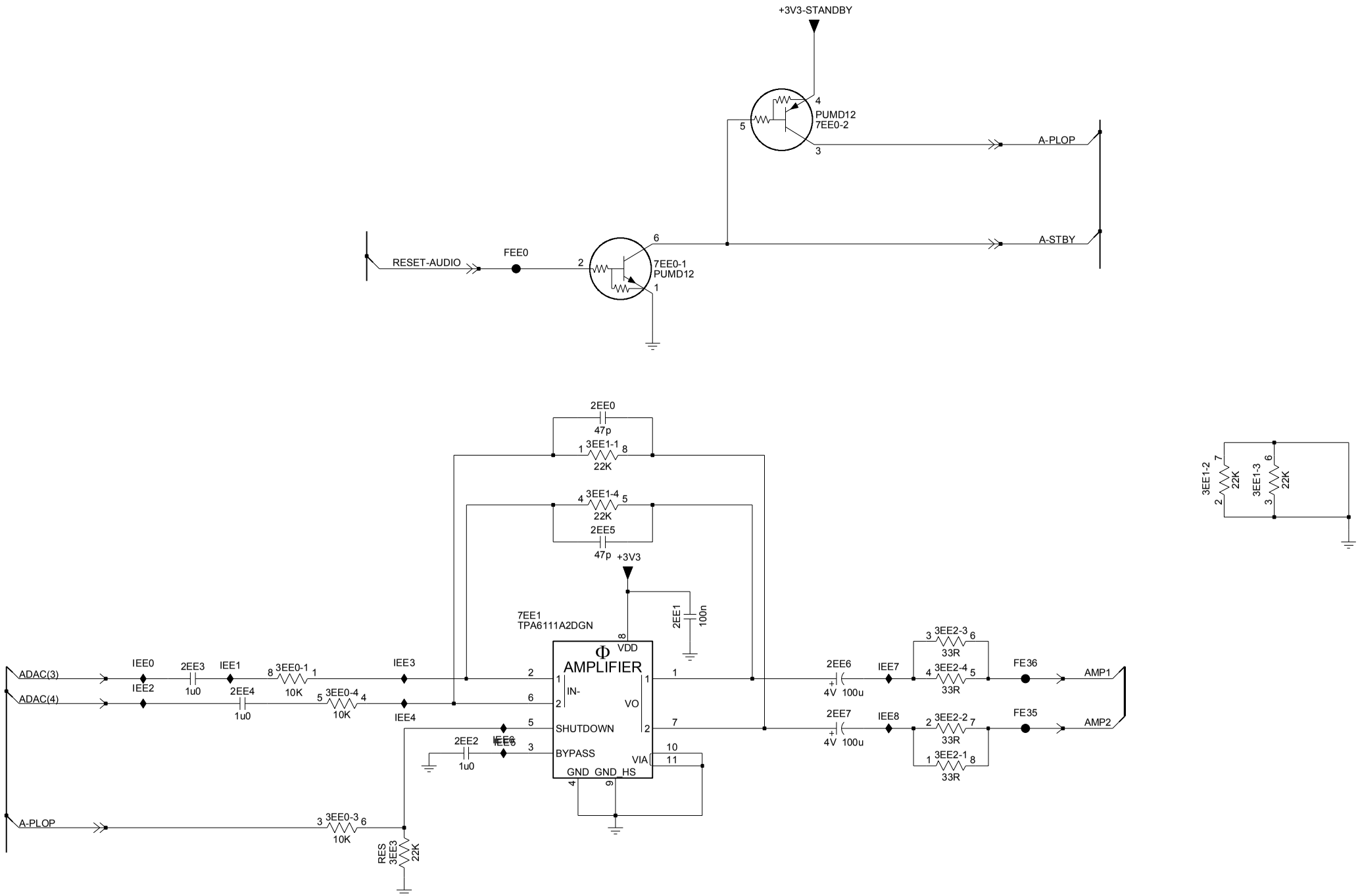
Headphone

B04E Headphone

B04E



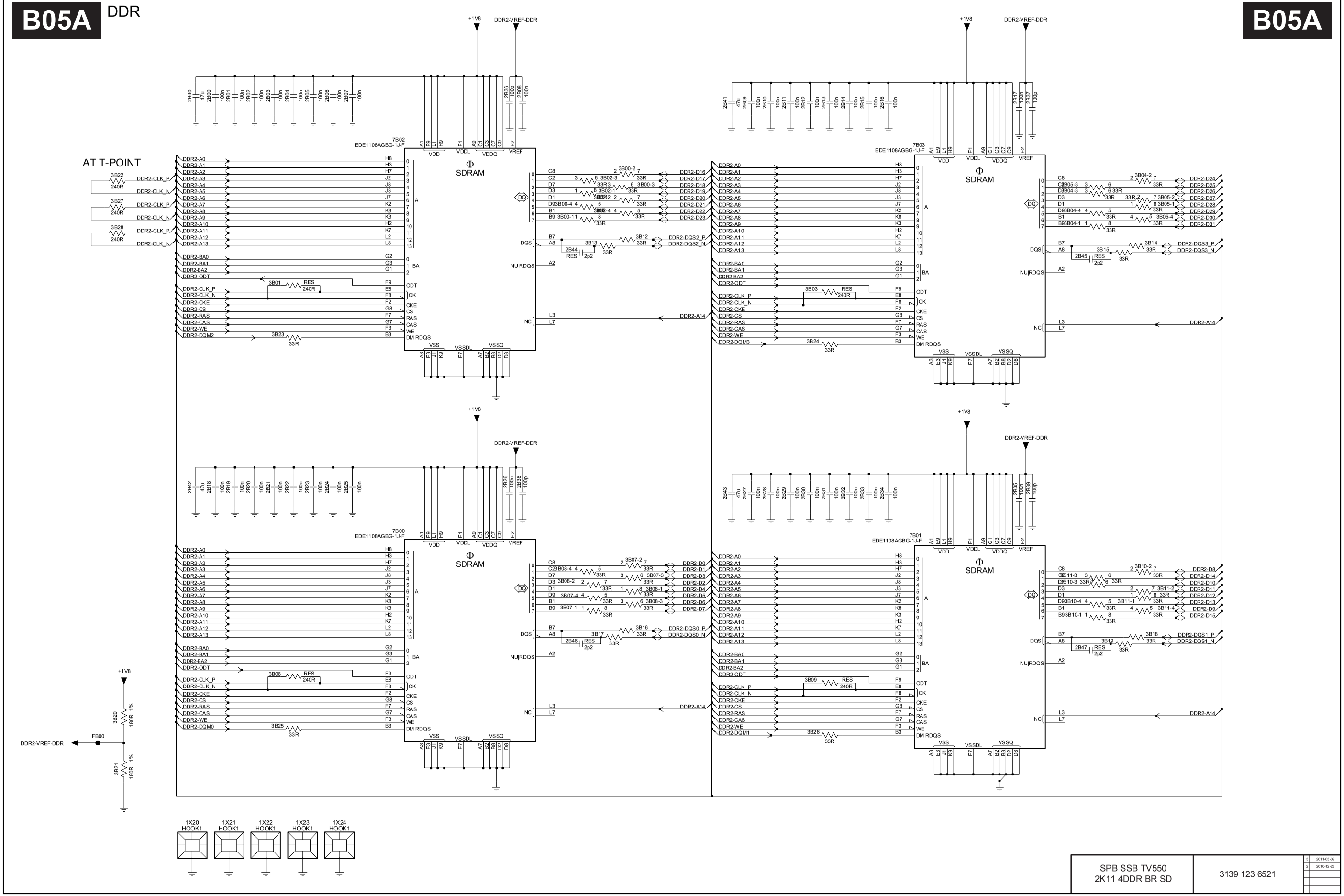
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_042_110415.eps
110415

10-5 B05 393912365213

DDR

B05A DDR



SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521

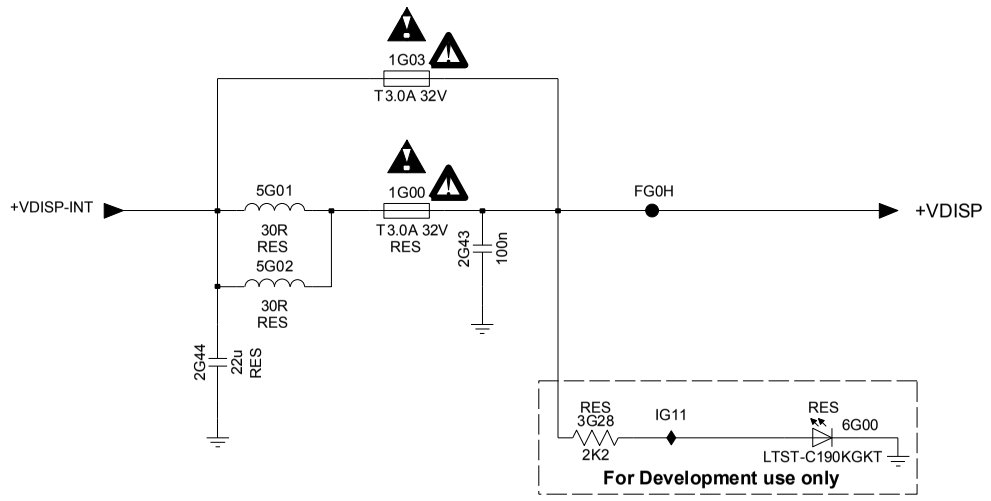
3	2011-03-09
2	2010-12-23

19110_043_110415.eps
110415

10-6 B06 393912365213
Display interfacing-Vdisp

B06A Display interfacing-Vdisp

B06A



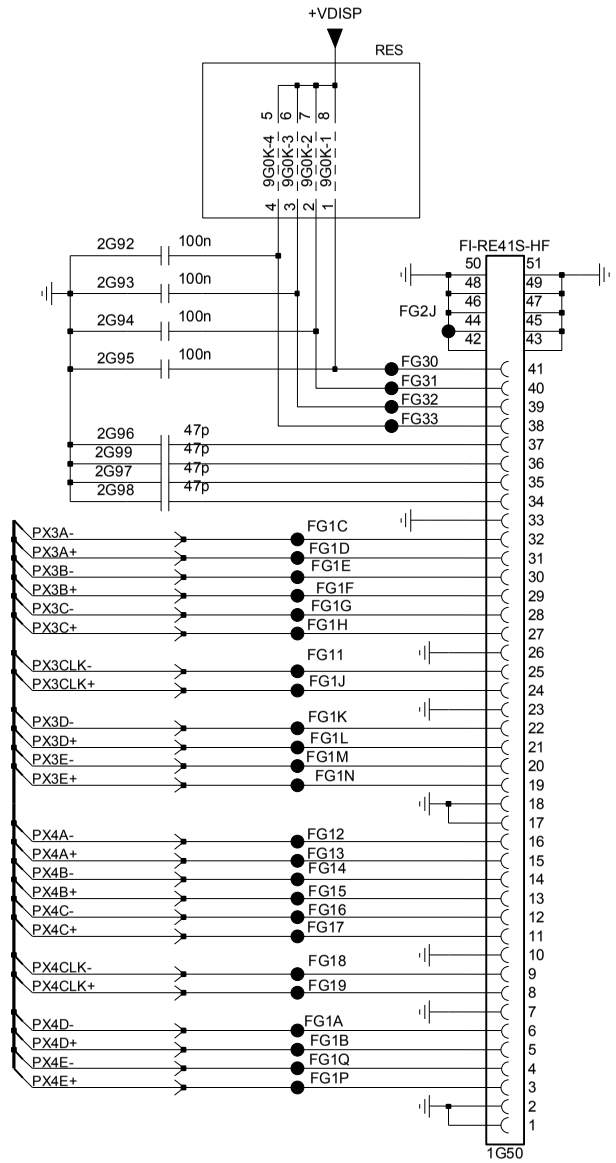
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2010-12-10 2 2010-12-10

19110_044_110415.eps
110415

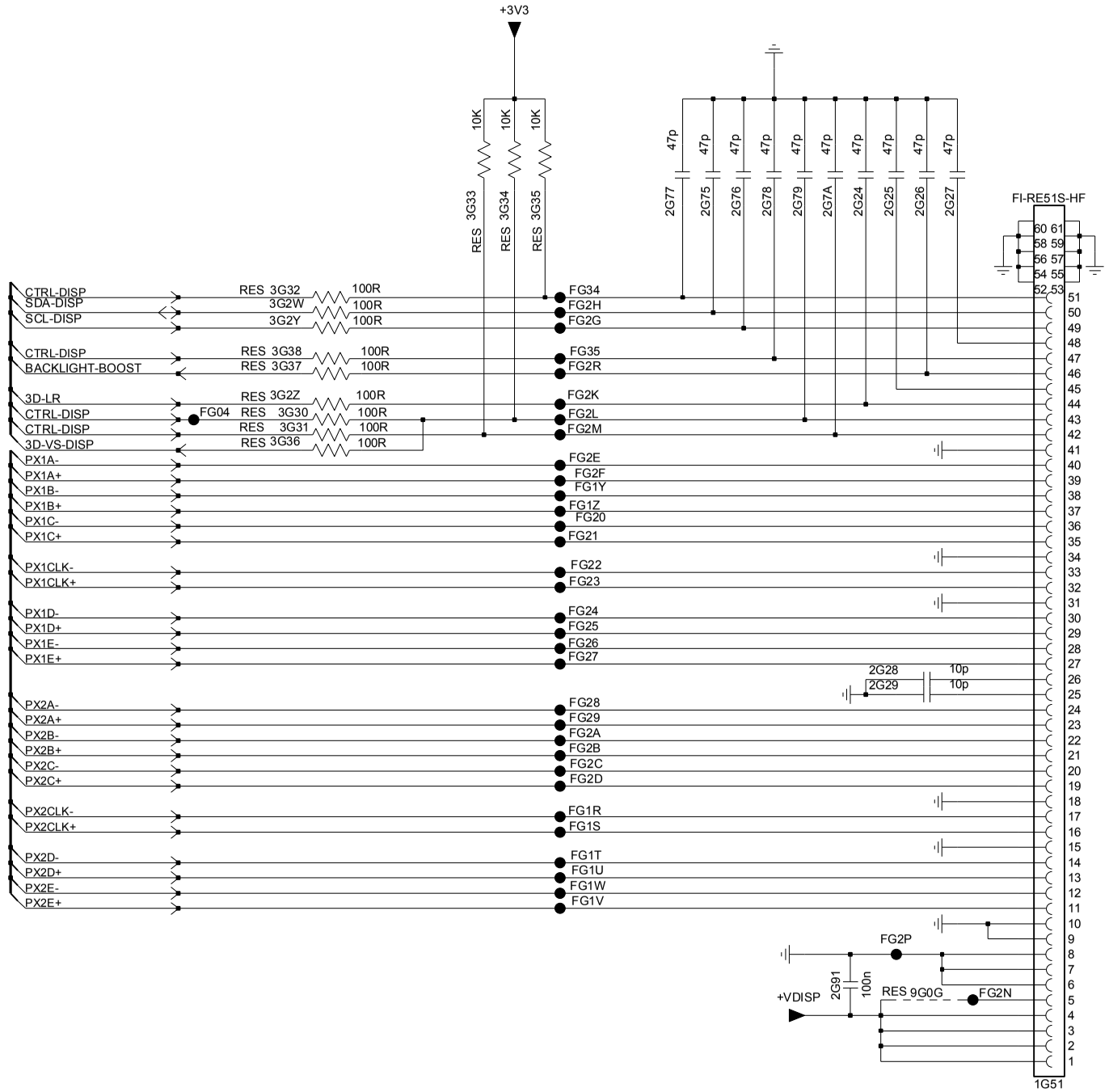
Video out - LVDS

B06B Video out - LVDS

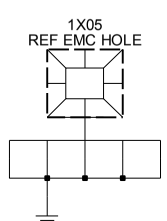
B06B



TO DISPLAY



TO DISPLAY



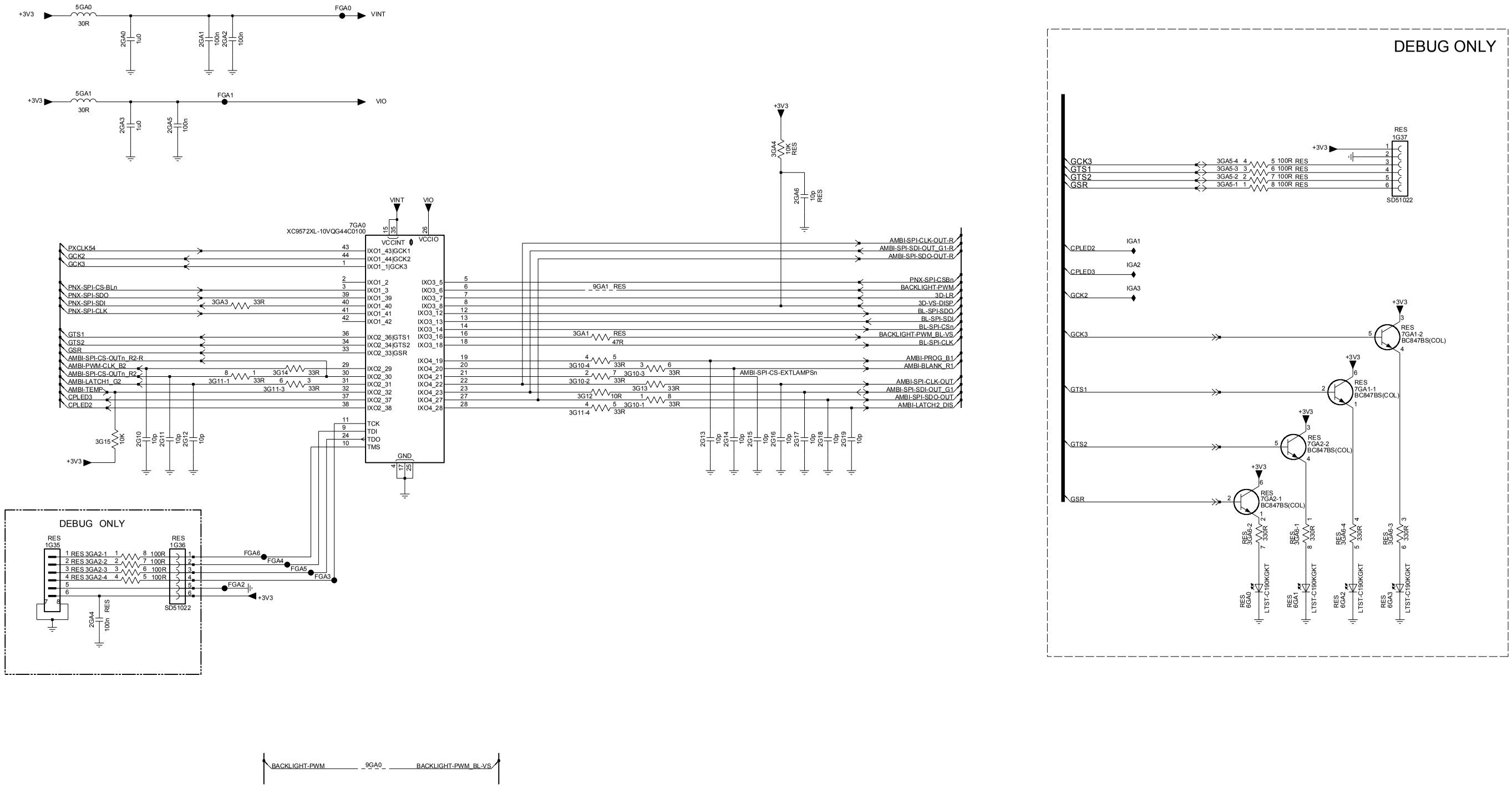
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_045_110415.eps
110415

AmbiLight CPLD

B06C AmbiLight CPLD

B06C



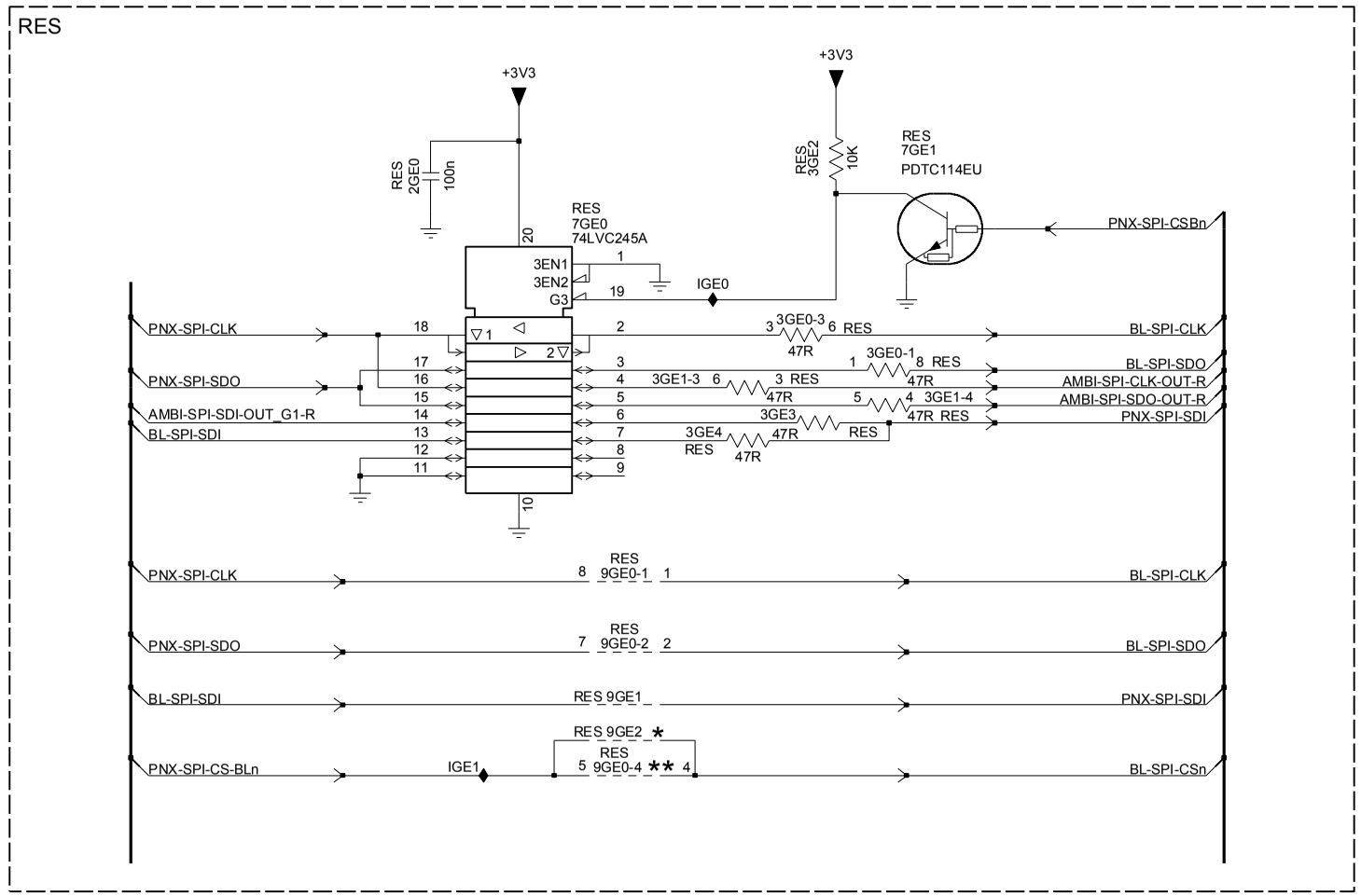
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_046_110415.eps
110415

SPI buffer

B06D SPI buffer

B06D



* Buffer

** Direct

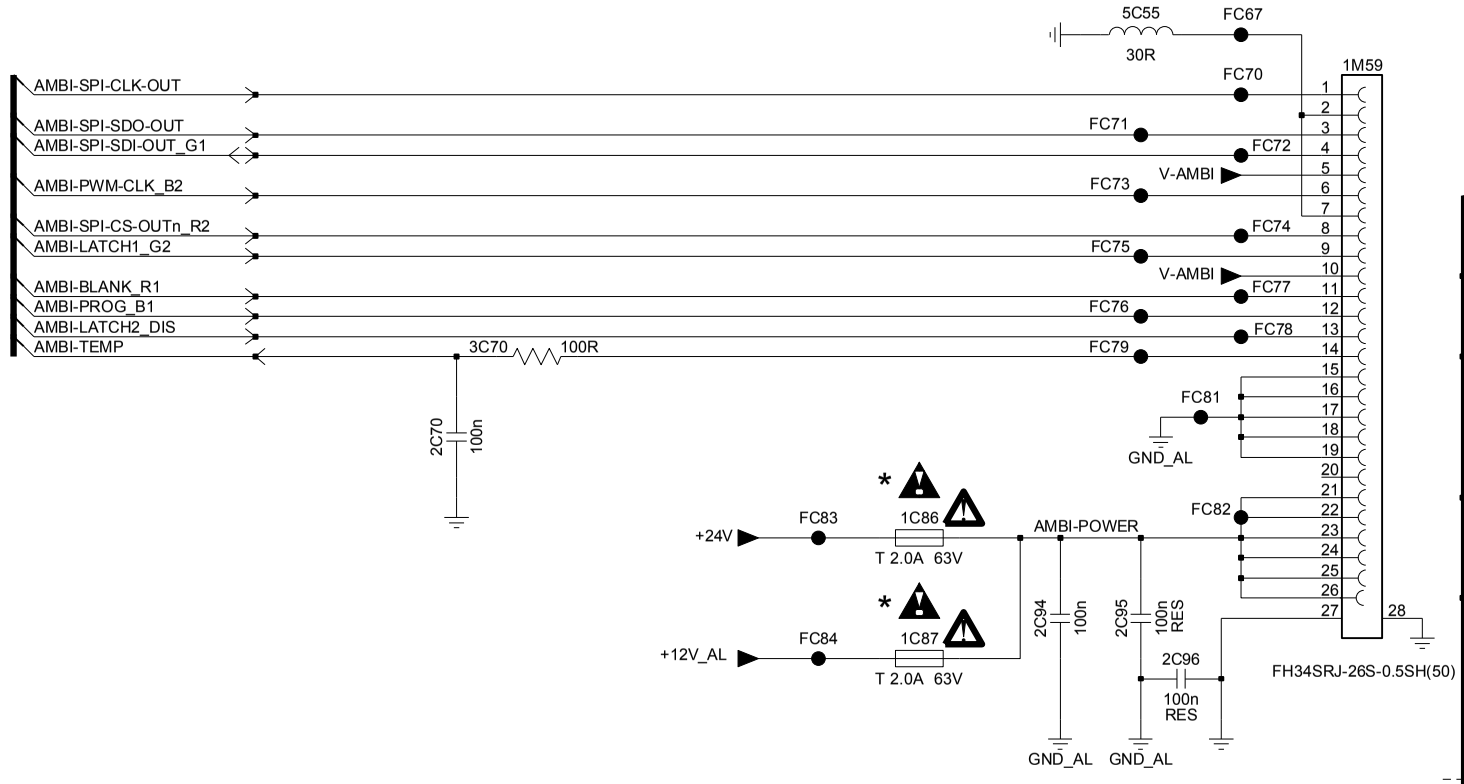
SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_047_110415.eps
110415

10-7 B09 393912365213
Connectors comp

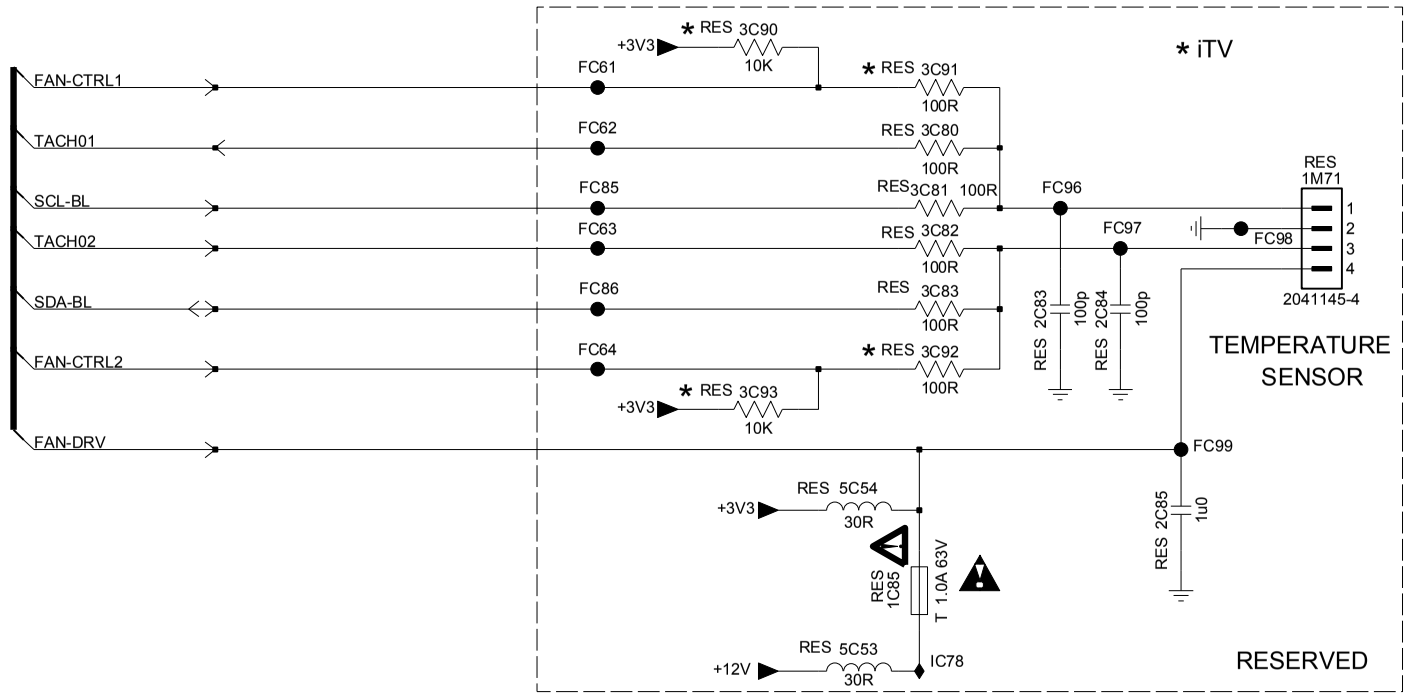
B09A Connectors comp

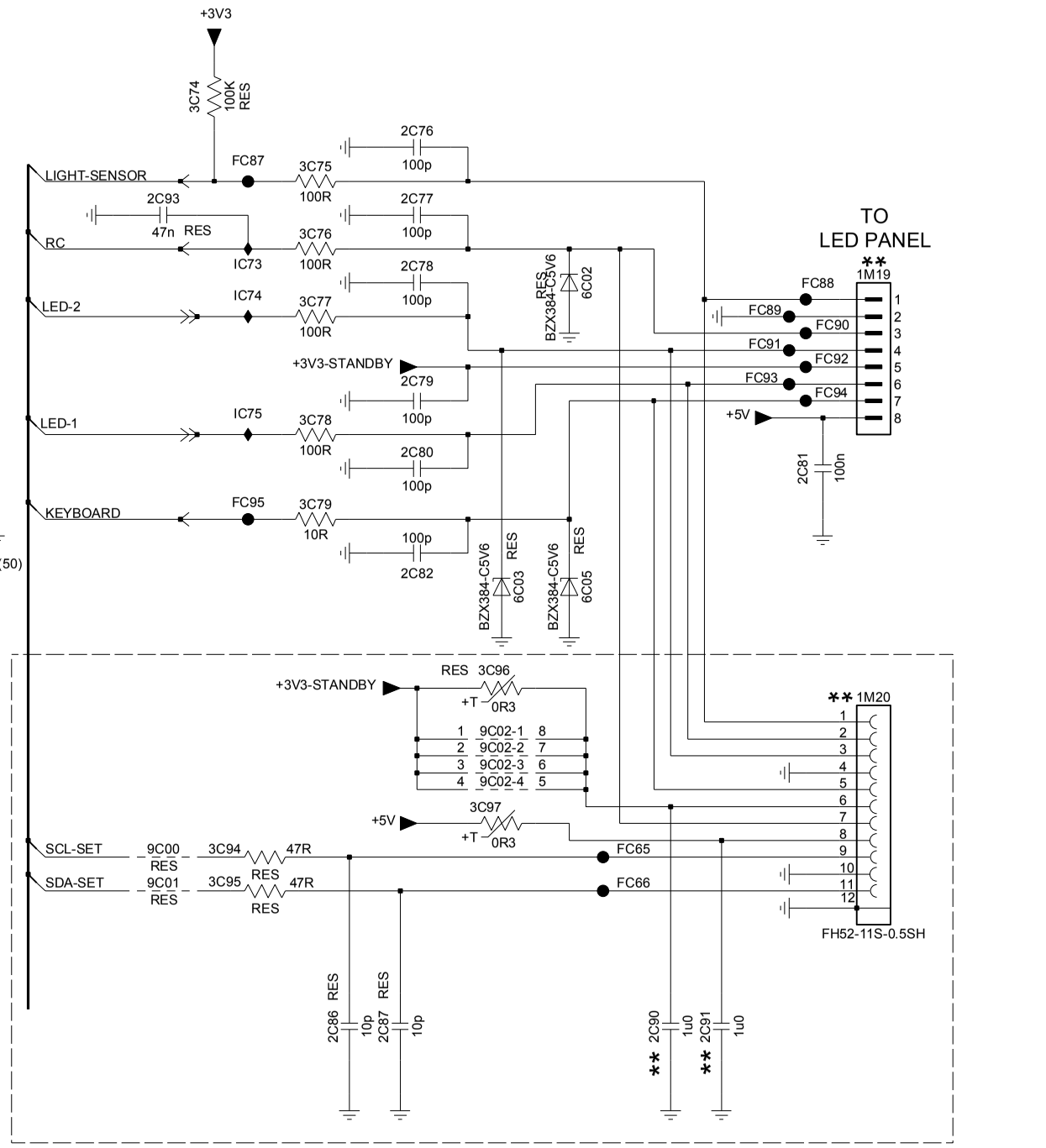
B09A



* Option table for Ambilight

ITEMS	BLOCKBUSTER	EMMY	SUNDANCE / INFINITY
1C86	N	Y	N
1C87	N	N	Y





** Option table for Leading Edge

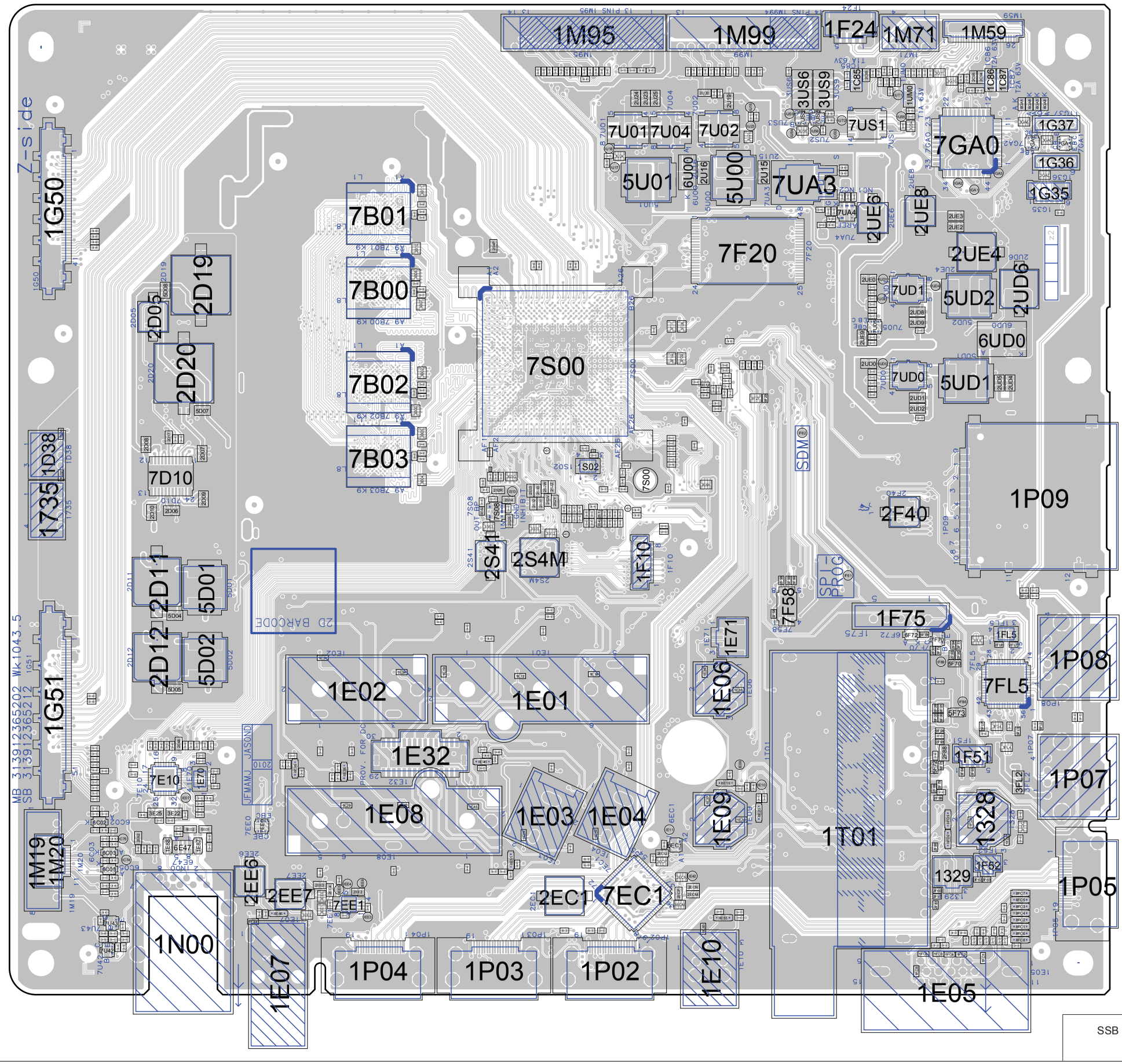
Items	BlockBuster / Emmy	Sundance / Infinity
1M19	Yes	No
1M20	No	Yes

SPB SSB TV550 2K11 4DDR BR SD	3139 123 6521	3 2011-03-09 2 2010-12-23

19110_048_110415.eps
110415

10-8 3139123652135SSB Layout

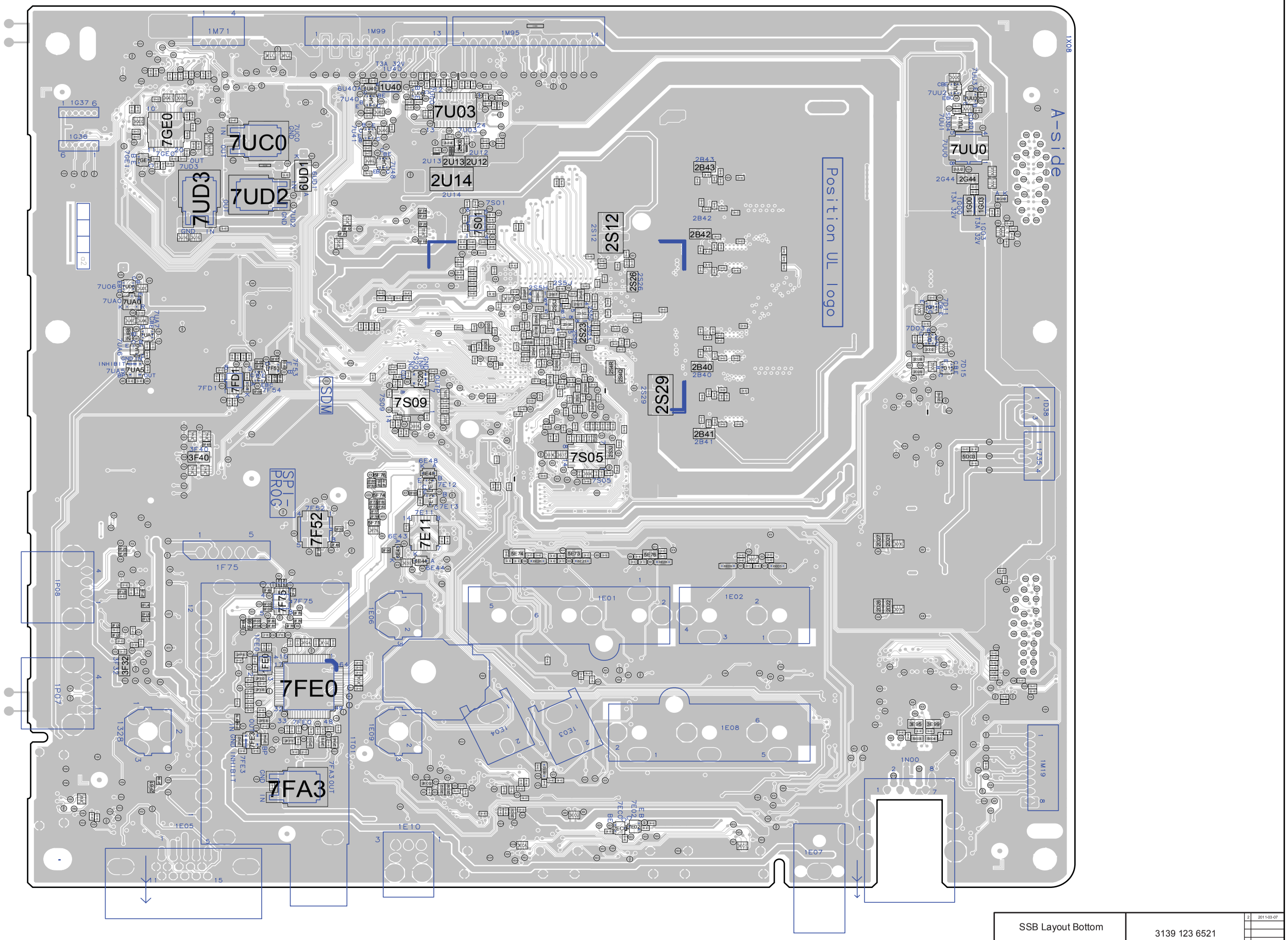
Overview top side



SSB Layout Top	3139 123 6521	2 2011-03-07

19110_001_110307.eps
110309

Overview bottom side



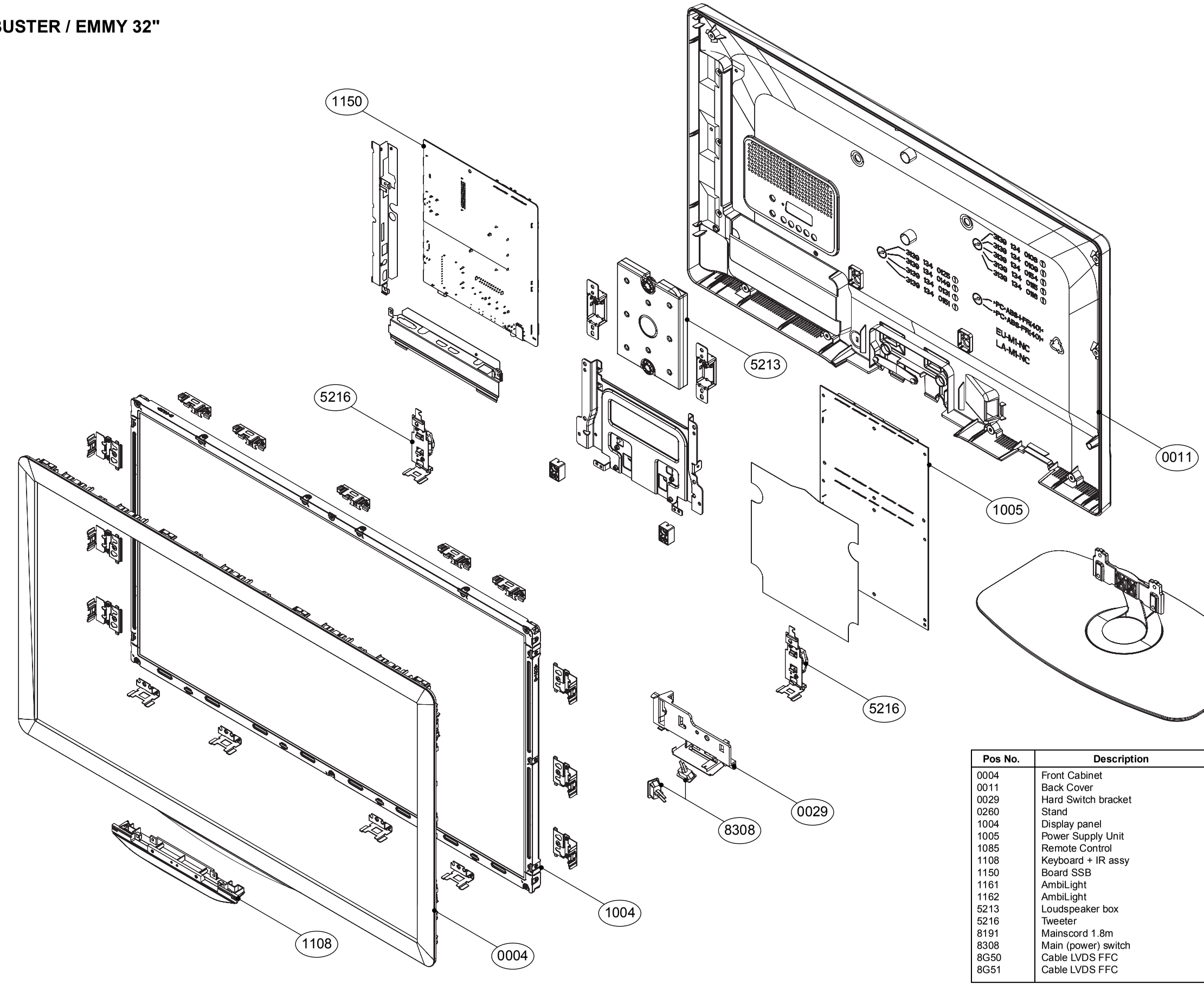
SSB Layout Bottom	3139 123 6521	2 2011-03-07

19110_002_110307.eps
110307

11. Styling Sheets

11-1 Blockbuster/Emmy 32"

BLOCKBUSTER / EMMY 32"

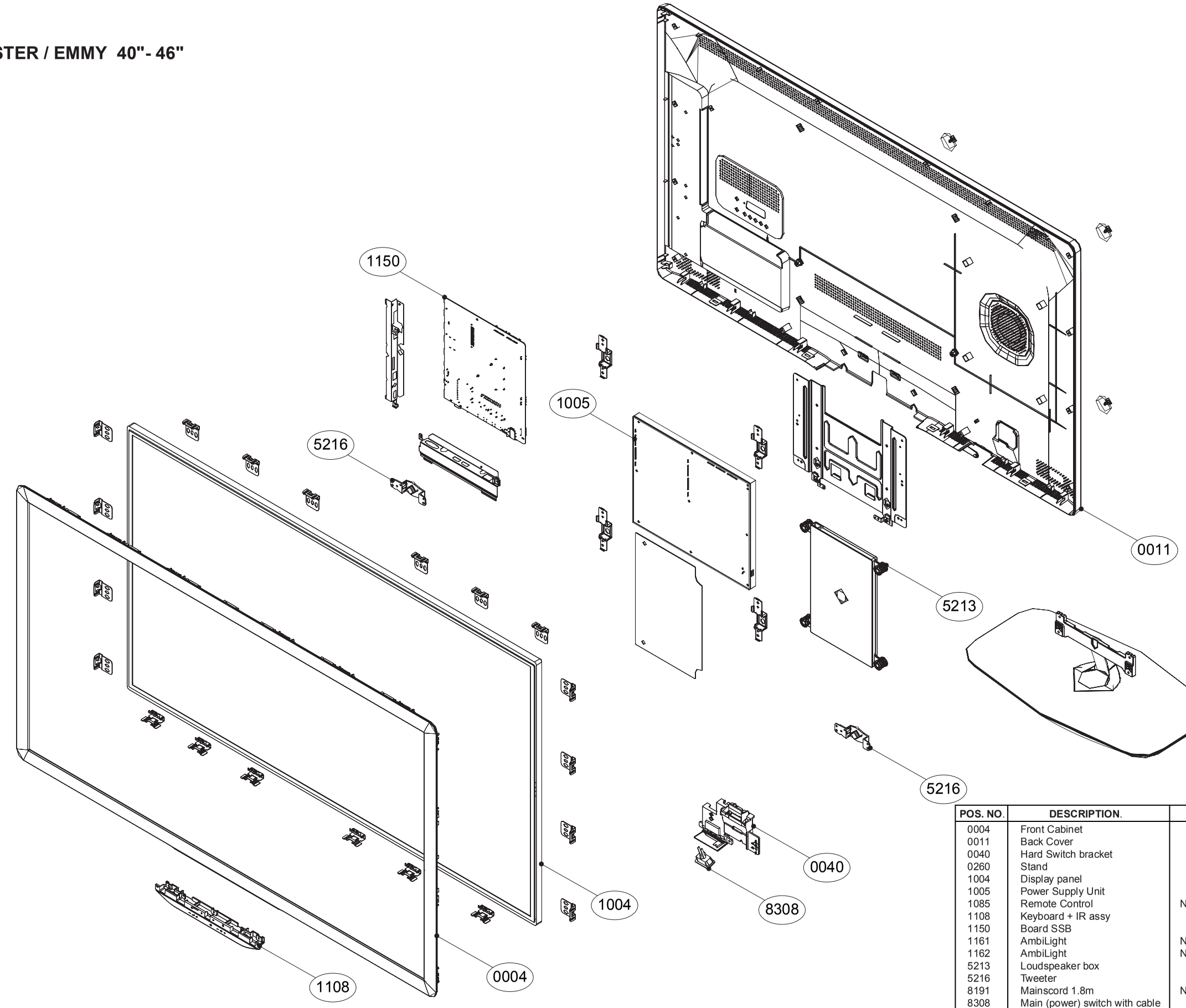


Pos No.	Description	Remarks
0004	Front Cabinet	
0011	Back Cover	
0029	Hard Switch bracket	
0260	Stand	
1004	Display panel	
1005	Power Supply Unit	
1085	Remote Control	Not displayed
1108	Keyboard + IR assy	
1150	Board SSB	
1161	AmbiLight	Not displayed
1162	AmbiLight	Not displayed
5213	Loudspeaker box	
5216	Tweeter	
8191	Mainscord 1.8m	Not displayed
8308	Main (power) switch	
8G50	Cable LVDS FFC	Not displayed
8G51	Cable LVDS FFC	Not displayed

19110_049_110420.eps
110420

11-2 Blockbuster/Emmy 40" - 46"

BLOCKBUSTER / EMMY 40"- 46"



POS. NO.	DESCRIPTION.	REMARKS
0004	Front Cabinet	
0011	Back Cover	
0040	Hard Switch bracket	
0260	Stand	
1004	Display panel	
1005	Power Supply Unit	
1085	Remote Control	Not Displayed
1108	Keyboard + IR assy	
1150	Board SSB	
1161	AmbiLight	Not Displayed
1162	AmbiLight	Not Displayed
5213	Loudspeaker box	
5216	Tweeter	
8191	Mainscord 1.8m	Not Displayed
8308	Main (power) switch with cable	
8G50	Cable LVDS FFC	Not Displayed
8G51	Cable LVDS FFC	Not Displayed

19110_050_110420.eps
110420